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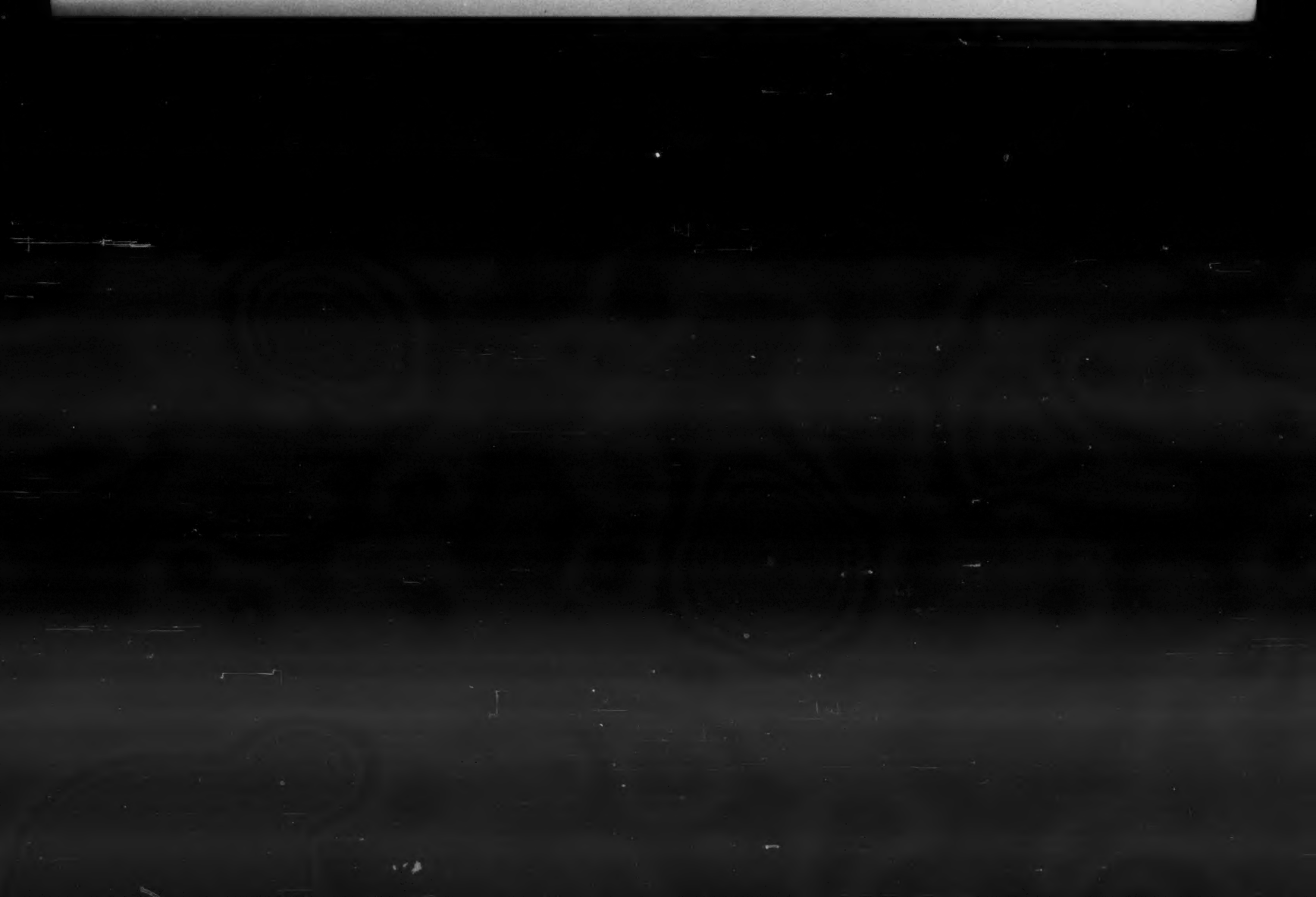

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SOMATIC PAIN PRODUCED BY FIBROLIPOMATOUS NODULES SIMULATING URINARY TRACT PATHOLOGY

Louis M. Orr, M.D.
Fred Mathers, M.D.
Thomas C. Butt, M.D.
Orlando, Fla.

The diagnosis of many disease processes is based usually upon a careful analysis of the associated pain. While this is particularly true in urologic diseases, it is by no means uncommon to fail to find a cause for pain which is considered to be pathognomonic of urologic pathology. Patients are not infrequently seen who present pain typical of ureteral colic or of renal stone which may also be accompanied by disturbances in renal and ureteral physiology but in whom no evidence of urinary tract pathology can be found. The search for the cause of the so called "typical" urologic pain should not end with the negative report from the urologist.

It should be borne in mind that in the face of negative urinary tract investigations the existence of radiation phenomena as the result of radiculitis, "intercostal neuritis," and parietal muscle spasm in the region of the spine should be considered. The clinical manifestations of these phenomena are in the form of (1) cutaneous hyperesthesia in the spinal segment involved and (2) muscle spasm or atrophy of those muscle groups in the area of the particular spinal segment. To these two concepts Ussher has added a third, or visceral component.

We have for so long been impressed with the reference of visceral pain to the external dermatomes of the body, or along the course of cutaneous nerves, that we seldom think of somatic pain as being of etiologic significance until all studies of the suspected viscera fail to reveal a cause for the pain. This is no doubt due to our being conditioned by long years of thinking of visceral referred

pain to the neglect of an understanding of somatic pain. Most investigational work in the past has been in relation to pain referred from viscera and the neurologic pathways have been carefully charted.

It is the purpose of this discussion to present a not uncommon mechanism for the production of symptoms simulating disease of the urinary tract which is not generally known and frequently overlooked as illustrated in the cases to be presented.

Sir Thomas Lewis, in discussing pain of visceral disease, states that Mackenzie's concept of referred pain was best explained by the fact that viscera are tissues which have no true positional sense or detailed representation in the cortex. His hypothesis can be briefly stated in this manner: The impulses from the visceral structures on reaching the sensorium are interpreted as pain and the pain is referred to the cutaneous segment or dermatome in default of sharper localization. Lewis further states that there is no reason and no gain in distinguishing in any fundamental way between nerves conveying pain from deep somatic structures or from sensitive visceral structures. Physiologically and anatomically, pain fibers supplying the two types of tissues are alike and the fact that those from somatic structures at first use the channel of the spinal nerve and that those from the visceral structures at first use the channel of the anatomic sympathetic system before entering the posterior roots is really immaterial. The innervation of the kidney and ureter has been described by Kuntz and will not be reviewed. In this paper we are dealing only with the D-12, L-1 and L-2 dermatomes.

During the recent world war the British investigators, Copeman and Ackerman, dissected the backs of 14 cadavers in an effort to determine the legitimacy of complaint in soldiers who presented characteristic symptoms of myositis or fibrositis of the lower back. A constant and definite finding were deposits of fibrofatty tissue which occurred beneath the superficial fascia in well defined areas, even in grossly wasted bodies in which most of the body fat elsewhere had disappeared. They termed this consistent localization of fat "the basic fat pattern" (fig. 1). It was noticed that the fascia was not of uniform thickness and in certain places there were actual deficiencies present through which small lobules of fat were seen to herniate. It was likewise found that the cutaneous branches of the lumbar nerves, accompanied by blood vessels, pierce this fascia through definite foramina after leaving the muscle. Not infrequently were lobules of fat seen partially herniated into these foramina.

In an examination of 65 soldiers presenting symptoms of lumbar

fibrositis, Copeman and Ackerman found well defined, painful nodules along the lower borders of the erector spinae muscles and the crests of the ilia. These points of tenderness they designated as "trigger points." The location of these trigger points followed a constant grouping which they designated as a "pain pattern." This

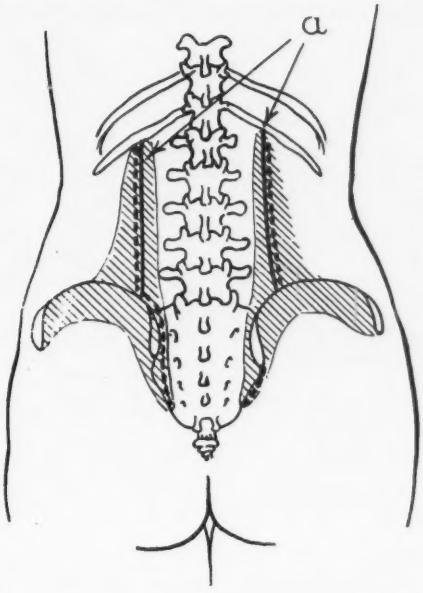

Fig. 1

The "basic fat pattern." This appears to represent the irreducible minimum of fat in the back under any condition. The dotted line represents the deeper portion contained in the fascial angle along the outer edge of the sacro-spinalis muscle. (Copeman and Ackerman.)

pain pattern of the back and gluteal region corresponded in anatomic relationship to the "basic fat pattern" of the same region. They found the nodules to contain fatty and fibrous tissue to which they gave the term "fibrositic." They further stated that because of the exigencies of warfare no special stains for nerve fibers were made.

Mathers and Butt have since located fibrolipomatous nodules at numerous points in the cervical and dorsal regions along the borders of and over the surface of the erector spinae muscles. From their studies, to be published at a later date, they question the herniation of fat lobules through nerve foramina and believe that painful fat nodules represent a local pathologic process in the normal layer of body fat which lies over the muscles of the back when the local dis-

turbance is such as to cause pressure upon one or more of the cutaneous nerves.

These nodules are palpable to the examining finger and pressure will produce the pain complained of and oftentimes stimulate distant referred pain such as that arising from disease within a viscus. Local injection of novocaine directly into the nodule will eliminate

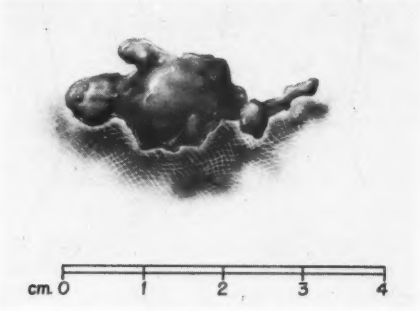

Fig. 2

Diagramatic sketch of a fibrolipomatous nodule.

the pain to the complete satisfaction of the patient. Surgical removal of the nodule has resulted in permanent relief of pain, both local and referred.

Whereas Copeman and Ackerman were concerned with the pathology and etiology of true myositis and fibrositis of the back, our further studies have revealed these nodules (fig. 2) as being a source of pain and an etiologic factor in the production of symptoms simulating true ureteral and renal disease. Because of the histology (fig. 3) of these nodules, we have elected the term "fibrolipomatous" rather than "fibrositic" as being more descriptive of the nodule.

In that we are here concerned only with a discussion of those sources of somatic pain simulating ureterorenal disease, we must be confined necessarily to irritating foci affecting the twelfth dorsal and/or the first and second lumbar dermatomes. It must be kept in mind that these nodules represent only one type of irritant which may produce somatic pain which simulates ureterorenal disease. The report of the case by Wills and Atsatt in which ureteral spasm was relieved by correction of the irritating focus about the spinal articulation of the first lumbar vertebra illustrates another cause of somatic pain. Two of the cases here reported received complete relief from pain by correcting a previously unknown pelvic tilt by heel lifts supporting the shorter leg.

Ussher, in 1933, described the original concept of viscerospinal syndrome (fig. 4). His concept was that points of irritation (cutaneous, muscular, articular) the "somatic triad," are primarily stimulating postganglionic fibers supplying a viscus resulting in spasm of smooth muscle which in turn reflects itself as disturbance in nor-

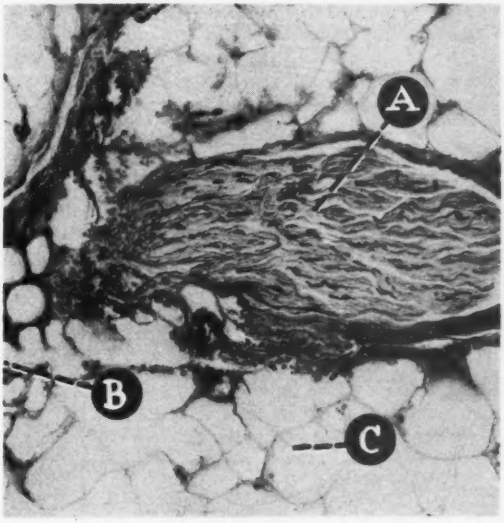

Fig. 3

Histologic structure of a fibrolipomatous nodule: (a) Nerve fiber, (b) Connective tissue, and (c) Fatty tissue

mal physiology of the involved organ. This is a reversal of the old concept that irritative processes in viscera produce reflex spasm of striated muscles which receive innervation from the same level of the spinal cord. In 1940, he presented a large series of cases in which smooth muscle spasm was a basic pathologic disturbance which was fundamentally due to irritations of posterior branches of cutaneous nerves because of articular disturbances. This concept has not received general recognition.

This brings up the question: Can actual disturbance in kidney physiology such as the secretion of urine be produced by these somatic irritants, and can the function of the ureter and bladder as regards motility or smooth muscle spasm be disturbed? Two of our cases presented frequency of urination which were relieved by removing the nodules, and one was also relieved of bouts of ureteral spasm which were of such intensity to warrant cystoscopic examination on three occasions with fruitless effort. Future work is required

to prove or disprove this hypothesis which is, as yet, based purely on clinical observation. The difficulties of such proof are obvious because instrumentation of the urinary tract is in itself productive of physiologic changes. It is planned to investigate this in the future.

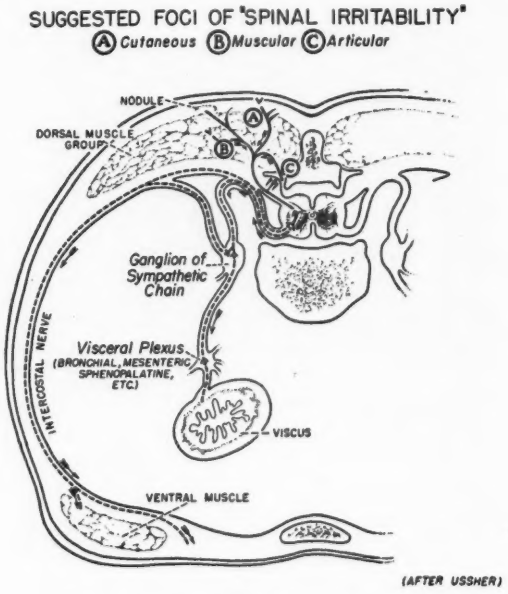

Fig. 4

Diagram showing chief components of viscerospinal syndrome. A fibrolipomatous nodule is depicted as a focus of irritability in addition to "A," "B," and "C." From these foci, afferent impulses are carried to the cord by dorsal nerve roots. Synaptic connections are shown relaying the impulses through the ventral roots to the viscus by way of the viscero-efferent sympathetic network. (Ussher.)

We know that spasm of the loin muscles can be produced by stimulating the healthy ureter or renal pelvis, as shown by Ockerblad and Carlson and substantiated by McLelland and Goodell, and that the spasm persists long after the stimulus is withdrawn. It is not too fanciful to expect visceral changes when these muscles are thrown into spasm by somatic impulses.

The cases to be presented represent our original observations of causes of renal and ureteral pain originating in somatic structures in the form of fibrolipomatous nodules and orthopedic deformities in patients who have been studied repeatedly with negative pathologic findings by the usual procedures employed in the diagnosis of urinary tract pathology.

Case Reports

Case 1. J. M. S., a 25 year old white male farmer, stated that in January, 1945, while in the armed forces, he developed a sudden, moderately severe pain in the right costovertebral region radiating to the genitalia. He was told that red blood cells were found in the urine. Studies in a military hospital with cystoscopic examination and retrograde pyelograms did not disclose any cause for the symptoms. Similar episodes later occurred and urologic investigations were performed on two other occasions with normal findings. He continued to have an almost constant pain in the right costovertebral angle. Since discharge from the service, this pain has become exaggerated whenever he attempted to drive a tractor or truck and has been relieved only by complete rest.

Physical examination revealed a slight pitting edema of the left ankle as a residuum of phlebitis which had occurred in 1941 and a palpable, tender nodule at the lateral edge of the right erector spinae muscles at the level of the twelfth dorsal vertebra. Pressure on the nodule produced pain with radiation to the anterior abdomen and right groin. He stated that this pain was identical with the previous pain for which he had been cystoscoped three times since 1945. Injection of novocaine into the nodule produced temporary relief of symptoms. Permanent relief of the pain was secured by surgical removal. Frequency of urination, which had been of minor importance, was relieved.

Case 2. Mrs. L. R., aged 38, complained of pain in the left kidney region for the past 7 years. This pain was described as dull and constant, originating in the region of the left kidney and extending over the left renal area (fig. 5).

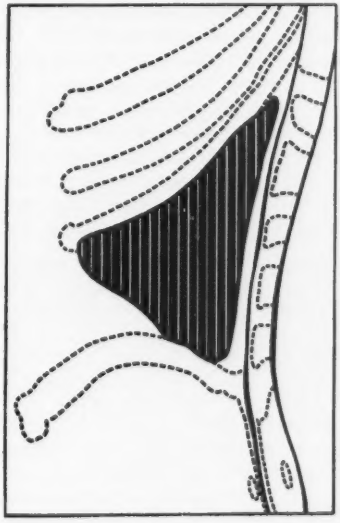

Fig. 5
Pain distribution in Case 2.

During the initial attack of pain 7 years ago, the presumptive diagnosis of renal calculus was made. Cystoscopic examination at that time was reported as negative for any pathology and she was told the stone had probably passed.

Subsequent to this attack, she continued to have the sensation simulating renal colic and was cystoscoped on four different occasions with complete urographic studies. The report of the urologists continued to be negative for pathology. Since the date of the first attack of pain, the patient had undergone an appendectomy and right oophorectomy without relief of symptoms.

The patient was first seen by one of us (F.M.) in February, 1947. Upon examination, a painful, palpable nodule was found at the level of the second lumbar vertebra, 3½ cm. to the left of the midline. One c.c. of novocaine was injected and the patient experienced complete relief. As she expressed it, "My kidney stone is gone."

Three weeks after the initial injection, the pain returned and she was advised to have the nodule excised. On March 20, 1947, the mass was excised. The following day the patient was free of pain. Examination a short time ago revealed that she still has complete relief of pain.

CASE 3. Mrs. D. L., aged 36, complained of pain in the right kidney region. The patient states that 14 years ago, while riding horseback, she had a sudden twist as the horse stumbled which was followed by pain similar to that complained of at present.

This pain is described as a dull aching pain which extends from the right costovertebral angle to the right lower quadrant. There is no complaint of dysuria, frequency or hematuria. The pain is more severe when sitting. The pain is not relieved by heat, although gentle massage will at times give her partial relief. Mild sedation is frequently required. She has been cystoscoped repeatedly, and in 1941 underwent a right nephropexy. Other than ptosis of the right kidney which has been successfully repaired, the urologic examinations have been repeatedly negative for pathology. During the past 7 years the patient has been carefully followed by urologists, orthopedists, gynecologists, and general practitioners. Three pregnancies have been successfully completed—17 years, 4 years, and 8 months ago. During the past 6 months pain in the right kidney region has continued unabated. Careful examination has revealed no cause for this pain until a nodule was found in the region of L-2, 4 cm. to the right of the midline. Pressure over this site reproduced the pain which the patient has complained of and injection of novocaine into the site of the palpable tumor mass produced complete relief for 5 days.

The patient was recently admitted to the hospital and a fibrolipomatous tumor was removed with repair of a small fascial hernia. Up to the present, the patient has had complete relief of pain which had been endured for 14 years.

CASE 4. C. G., aged 27, was referred by an urologist for investigation of a possible painful nodule in the left lumbar region. Chief complaint: Pain in the left testicle. On March 29, 1947, the patient states that associated with frequency of urination he developed a pain in his right testicle which radiated from the testicle to the right lumbar region. The pain was dull and aching in type and would seem to go through the right side of the abdomen from the testicle to the region of the right kidney. The patient stated that at times the pain seemed colicky in nature, although usually it was a constant "toothache" type of pain. Prior to this attack, excellent health had been enjoyed and no pain similar to the present had been experienced. In 1942 the left testicle was removed because of cryptorchidism.

Examination revealed a healthy white male with no abnormal findings other than absence of the left testicle and a tender area in the right side of the back

5 cm. from the midline between L-1 and 2. Pressure over this point produced pain which was referred to the right testicle. Complete urologic examination was negative for pathology. At no time did the patient have any tenderness on palpation of the testicle or spermatic cord.

Preliminary injection of novocaine relieved the pain completely. On May 30, 1947, the nodule was excised. When last seen the patient stated that the pain in the right testicle and back had been completely relieved.

CASE 5. Mrs. B. P., aged 34. Chief complaint: Pain in right side of the back for 12 years. The patient states that the pain extends from the right costovertebral angle and to the right lower quadrant. Five years ago an appendectomy was performed for the relief of this pain without benefit. Four years later a laparotomy for adhesions resulted in no benefit. During the interval between these operations she was studied urologically and no pathology found. In 1947, the pain had become constant and more severe upon fatigue, but now the pain had become so severe that she was unable to carry on her household duties. Following the second operation, an orthopedic surgeon made the diagnosis of arthritis and neuritis and she had received treatment in the form of physiotherapy, sedation, estrogens, etc., without relief of the pain. Repeated urologic examinations had not revealed a cause for the pain. In 1947, the patient became "desperate" and underwent a thorough examination in a well-recognized clinic. No pathology to account for the pain was found. Upon return home, urologic studies were again carried out with normal findings. A gynecologist later stated that she had a "tipped womb."

Physical examination revealed a very tender localized area in the region of L-2, 3 cm. to the right of the midline. No other pathology was noted after a careful examination. Urinalysis and complete blood count were normal. It was felt that the pain complex could be accounted for by the localized area of tenderness. Due to excessive fat in the region of the painful area, it was impossible definitely to palpate a nodule. However, following the injection of 3 c.c. of 1 per cent novocaine on two occasions at weekly intervals, there was complete relief of pain for 48 hours. Subsequently, an exploration of the back revealed a fibrolipomatous nodule which was excised. This mass was exceptionally large, measuring approximately 3 by 2 by 5 cm. The operation was followed by complete relief of pain up to the present time.

CASE E. H., a white male, aged 44, was seen complaining of pain over the right loin. The pain was described as of dull aching quality worse at the end of the day and especially after driving his car for long distances, which his occupation necessitated. The pain was relieved by lying down but soon returned after arising in the morning. He was particularly anxious to find out if he had "kidney trouble."

His past history was not revealing except for a minor back injury 18 years previously, sustained in a motorcycle accident. He remained in bed for one week at that time and had never felt any back pain until the present episode.

Review of his history by organ systems elicited no other significant symptoms.

Examination disclosed a well developed and well nourished man who indicated the right costovertebral angle as the site of his pain. General physical examination was within normal limits except for deep tenderness over the right costovertebral angle especially upon fist percussion. His posture was good—motion of the spine was not limited and was painless. The feet were pronated with some contraction of the heel cords and there seemed to be slight

visible shortening of the right leg with a minor compensatory C-shaped dorsolumbar scoliosis with concavity to the right.

The urine analysis was normal except for a faint trace of albumin. Urologic investigation including pyelograms disclosed no abnormalities. X-ray examination of the pelvis and lumbar spine in the upright position with normal weight-bearing revealed a 4 mm. shortening of the right leg with tilting of the pelvis.

He was given a ⅜ inch heel correction on the right and instructed in proper exercises for improving body mechanics with prompt relief of his pain.

This case illustrates a type of chronic pain without radicular radiation probably arising from the deep ligamentous structures of musculature produced by stress from abnormal body mechanics.

CASE 7. J. J. D., a white female, aged 45, was seen July 22, 1947, complaining of "kidney pain" for 15 years. She described her problem as episodes of severe pain of a steady aching quality beginning in the left costovertebral area and radiating anteriorly and downward to the left groin. These bouts of pain would be precipitated by exercise or exposure to cold and would last for 10 days to 2 weeks. She had been under treatment by a urologist for years, having had many cystoscopic examinations and ureteral dilatations. After each treatment she would have such severe pain that bed rest would be required and this seemed to produce gradual relief.

Her past health had been good. A hysterectomy had been performed 14 years before for "excessive bleeding."

She was seen during an acute attack of pain which followed a strenuous day of house cleaning.

Examination revealed a well devepoled woman in moderate pain. There was an exquisitely tender point at the outer edge of the erector spinae muscle group on a level with the 9th dorsal spinous process. Pressure over this point caused the pain complained of to be intensified and referred to the left groin. A zone of skin hyperesthesia corresponding to the segment of skin supplied by the left 12th dorsal nerve was demonstrated. There was some spasm of the erector spinae group of muscles. Examination of the patient standing disclosed an obvious shortening of the left leg with a compensatory C-shaped dorsolumbar scoliosis. The pelvis was tilted to the right and the left shoulder was lower than the left. Novocaine injected into the tender area over the left costovertebral angle produced relief. She was seen when this acute episode had disappeared and complete urologic study was done. A moderate chronic cicatricial urethritis was found. Retrograde pyelograms were normal. A heel lift on the left heel to equalize the leg lengths corrected the scoliosis. She has been free of back pain and the zone of cutaneous hyperesthesia has disappeared.

This case demonstrates a typical intercostal neuralgia or radiculitis of the 12th dorsal nerve probably due to mechanical strain from the dorsolumbar scoliosis.

CASE 8. E. L. H., a white female, aged 34, was seen March 8, 1947, complaining of pain in the left groin. She stated that at the age of 21 she developed a rather severe dull aching pain in the lower left abdomen. For this distress she was treated for colitis with various diets and antispasmodics, without relief. One year later the pain also involved the right lower abdomen without associated nausea or vomiting. An appendectomy was performed

and the right-sided pain disappeared without changing the left-sided pain. At the age of 30 a left oophosalpingectomy was done to relieve the pain. Since that time she had become somewhat nervous and her menstrual period had been reduced to 2 days with a scanty flow but no relief from the pain. An allergic study was done without finding anything of significance. An urologic study was next performed with no pathology found.

She described her pain as being under the left rib radiating to the groin. The pain in the lower left abdomen was more severe and seemed to "be in the skin" and not "deep inside."

Other than noted above, the past history was not significant. Examination by our group revealed the following: The patient was a tense, anxious asthenic young woman who located her pain with the hand over the left lower abdomen just above the inguinal region. General examination was within normal limits. There was definite skin hyperesthesia involving D-10 and L-1 on the left. A very sensitive area at the level of the 9th dorsal spinous process and over the lateral margin of the erector-spinae group of muscles was found. Pressure over this area reproduced the pain in the left lower abdomen and infiltrating this area with novocaine relieved the skin hyperesthesia. Her posture was good and no abnormal body mechanics could be demonstrated. X-rays of the spine were normal, as was the urine analysis and hemogram. A return of the pain in 10 days necessitated a second infiltration of the same region with novocaine. Since that time she has been free of pain.

This case illustrates again a segmental type of neuralgia of 7 years' duration for which unnecessary surgery and many types of investigations were performed.

Summary and Conclusions

We have for so long been conditioned in our thinking of visceral pain being referred to the external dermatomes of the body that we have become neglectful in our understanding of somatic structures as being the site of pain impulses which can simulate visceral disease. The original concept of the viscerospinal syndrome as presented by Ussher in 1933, now a recognized entity, pictured the reversal of the process in which impulses originated within the viscus and thence being referred to the skeletal structures. The British investigators, Copeman and Ackerman, in dissecting cadavers in search of an anatomic cause for the presence of "fibrositic nodules" or "myalgic spots" in the backs of soldiers complaining of myositis and fibrositis, described the "basic fat pattern" of the back. The fat pattern corresponded to the "pain pattern" formulated after a study of the backs of 65 unselected cases with myositis.

Clinical investigation of nodules in these locations have revealed them to represent a somatic cause for pain which simulated ureteral and renal diseases, after a careful search of the urinary tract had tomes of the twelfth dorsal and first and second lumbar vertebrae.

Our additional studies have located nodules in those body derma-

revealed no evidence of pathology. Because of the histologic structure of the nodules, we have elected the term "fibrolipomatous" rather than "fibrositic" as given by Copeman and Ackerman. Nerve fibers have also been demonstrated in the nodules which were not previously described. Although it is not within the limits of this paper to discuss possible alterations in renal physiology by somatic irritation, it does not seem too fanciful to expect visceral changes as a result of somatic impulses. Consideration of such possibilities offers a definite challenge to further investigation.

Except in the very obese patient the nodules are usually quite easily palpable and are painful to pressure. Oftentimes pressure will reproduce distant referred pain. Under local anesthesia pinching of the exposed nodule will cause radiation of pain to the ureter, kidney or testicle, depending upon the segmental location of the nodule.

In all patients who present pain which simulates ureterorenal disease, and in whom no evidence of urologic pathology to account for the pain can be found, a careful examination of the back and spinal column may result in finding a somatic cause for the pain in the form of a fibrolipomatous nodule or spinal deformity.

Several case records of patients have been presented who complained of renal and ureteral pain without evidence of urologic pathology after repeated investigations and in whom orthopedic deformities and fibrolipomatous nodules at the level of D-12, L-1 and L-2 vertebrae were found. Correction of the spinal deformities resulted in complete relief of pain up to the time of this report.

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MECKEL'S DIVERTICULUM

Report of Thirty Cases*

LOCKERT B. MASON, M.D.
R. W. POSTLETHWAIT, M.D.
H. H. BRADSHAW, M.D.
Winston-Salem, N. C.

MECKEL'S diverticulum is the result of the persistence of a portion of the embryonic omphalomesenteric duct which has failed to undergo normal involution. It has been the subject of many contributions to the literature, and adequate reviews are available.[1-3] Individual case reports indicate the multitude of pathologic changes which can be associated with this anomaly.

Greenblatt, Pund, and Chaney[4] devised a classification which correlates the symptomatology with the pathologic condition found in the diverticulum. This classification includes 6 groups:

I. Peptic Group. The diverticula contain gastric mucosa. Symptoms are similar to the peptic ulcer syndrome. Pain may be cyclic with definite relation to food intake, being aggravated by eating. Hemorrhage or perforation with peritonitis may occur.

II. Obstructive Group. Intussusception, volvulus, bands and adhesions and herniation may produce small bowel obstruction. The obstruction may be acute or chronic, complete or incomplete.

III. Diverticulitis Group. Inflammation of the diverticulum produces findings suggestive of appendicitis. Should rupture occur, the peritonitis is usually severe because of the nature of the contaminants at this level of the bowel.

IV. Umbilical Group. Communication with the umbilicus may be present, in which case a fecal fistula exists if the communication is patent throughout.

V. Tumor Group. Many varieties of benign and malignant tumors have been reported. Symptoms depend upon complications of the tumor; obstruction, perforation, and bleeding.

VI. Incidental Group. No symptoms are found. Heterotopic tissue is seldom found in this group.

Review of 30 cases of Meckel's diverticulectomy performed at the North Carolina Baptist Hospital during the last 8 years forms the basis of the present study. All of the patients were white. There were 12 males and 18 females, a ratio of 1:1.5. This ratio was in

*From the Department of Surgery, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, N. C.

contrast to the frequently quoted ratio of males to females as 2:1 or 3:1. In the 13 patients of the present series who were thought to have symptoms referable to the diverticulum, however, the ratio of males to females was 1.6:1.

No deaths occurred in this series. One patient was readmitted ten months after diverticulectomy and operated upon for volvulus of the terminal ileum. Another patient was operated upon for obstruction of the ileum due to adhesions a year following diverticulectomy. One patient was found to have a diverticulum of the concave aspect of the descending portion of the duodenum by roentgen examination two and a half years following Meckel's diverticulectomy.

According to the above classification 17 of the diverticula were classified as incidental findings. Ten patients had symptoms which placed them in the peptic group. For convenience, the peptic group has been subdivided in the present series to indicate the presence or absence of bleeding. Three instances of diverticulitis were found. No case belonging to the obstructive, umbilical, or tumor groups occurred. No foreign bodies were found.

Incidental Group

In 17 patients the finding of a Meckel's diverticulum was incidental to operation performed for other reasons. None of the patients had symptoms referable to the diverticulum. One specimen contained gastric mucosa and another showed lobules of adult pancreatic tissue without islets of Langerhans. The remainder of the diverticula were lined with small bowel mucosa. This is in accordance with the observation of Greenblatt, Pund, and Chaney that heterotopic tissue is seldom found in diverticula which do not produce symptoms.

Peptic Group with Hemorrhage

The symptom complex of massive bowel hemorrhage, with or without abdominal pain, associated with gastric mucosa in Meckel's diverticulum is well known. It most frequently occurs in infants but may occur in older age groups.

Case 1. A ten month old girl had a stool containing a large amount of bright red blood 5 hours before admission. The physical examination was normal with the exception of pale skin and mucous membranes. Hemoglobin was 8.4 Gm. A diagnosis of bleeding Meckel's diverticulum was made and celiotomy performed 9 hours following the initial hemorrhage. The ileum and colon were filled with blood. A diverticulum, 5 cm. in length, was removed from the antimesenteric border of the ileum 60 cm. proximal to the ileocecal valve. A 5 mm. ulcer was seen at the junction of the diverticulum with the

ileum. Following operation recovery was uneventful. Microscopic examination showed heterotopic gastric mucosa intermingled with the ileal mucosa. The ulcer was found in the ileal mucosa adjacent to the gastric mucosa.

CASE 2. A 13 month old boy had had vomiting and several bloody stools during a 24 hour period at the age of 9 months. Following this he had vomited occasionally but had had no more bloody stools until four months later on the day of admission when he passed a stool containing a large amount of bright blood and vomited frequently. Physical examination was negative with the exception of tachycardia and extreme pallor. Hemoglobin was 5 Gm. Diagnosis of bleeding Meckel's diverticulum was made. On exploratory laparotomy the small bowel was filled with blood. On the antimesenteric border of the ileum 36 cm. proximal to the ileocecal valve a diverticulum was found and removed. A 2 mm. ulcer was found at the neck of the diverticulum. Postoperative recovery was uneventful. Microscopic study showed heterotopic gastric mucosa and lymphocytic infiltration of the submucosal layers.

CASE 3. A 3 year old boy had had several bloody stools over a three day period at the age of 7 months. Hemorrhage recurred at the age of two and one half years necessitating five transfusions. Five weeks prior to admission seven transfusions were given because of recurrent bloody stools over a period of one week. The day prior to admission he passed an estimated 200 c.c. of dark blood per rectum. No pain accompanied the bleeding, and between episodes he appeared quite well. A great great grandfather, maternal grandfather, maternal male cousin, and three brothers were said to have been "bleeders." None had bled from the intestinal tract but they frequently had epistaxis or hemorrhage following tooth extraction. Blood transfusion had been necessary frequently. The women of the family and two of the patient's brothers had no bleeding tendencies.

The child appeared pale and ill. Blood was noted on the examining finger after rectal examination. No other abnormal findings were elicited. Hemoglobin was 4.7 Gm.; red blood cells 2.2 million; platelets 120,000; white blood cells 11,000. Bleeding time was 30 seconds. Coagulation time (Lee-White) was 5 minutes and 15 seconds. Clot retraction was normal.

Because of the characteristic history and examination and the normal clotting phenomena, a preoperative diagnosis of Meckel's diverticulum with ulcer was made in spite of the strong family history suggesting hemophilia. At operation the terminal ileum and cecum were filled with blood. A 3 cm. diverticulum arising close to the mesenteric border of the ileum 25 cm. proximal to the cecum was excised. Ulceration of the mucosa was found at the neck. Recovery was uneventful. On microscopic examination the ulcer was found to be at the juncture of gastric and ileal mucosa, and inflammatory cells were seen in the base of the ulcer.

CASE 4. Over a four month period a 2 year old girl had four episodes of hemorrhage, which consisted of several bloody stools during two to five days. Between the attacks she was relatively well. The last bleeding occurred 24 hours prior to examination. She appeared quite pale but the remainder of the physical examination was negative. Hemoglobin was 8 Gm. Diagnosis of Meckel's diverticulum was made and celiotomy performed. A 3 cm. diverticulum which was found on the antimesenteric border of the ileum approximately 50 cm. proximal to the ileocecal valve was removed. Recovery was uneventful. Microscopic examination revealed the presence of gastric and duodenal mucosa in the diverticulum. No ulcer was found.

CASE 5. A 17 month old boy had five loose stools which contained much dark blood in the 24 hours prior to admission. There had been no evidence of pain and no vomiting. Examination showed extreme pallor and marked tachycardia. Abdominal examination was negative. Hemoglobin was 4.5 Gm. A diagnosis of bleeding from a Meckel's diverticulum was made. At operation the ileum and colon were distended with blood. On the antimesenteric border of the ileum 15 cm. from the ileocecal valve a diverticulum approximately 1.5 cm. in length and 2 cm. in diameter was found. Adhesions to the surrounding structures were freed and the diverticulum excised. Recovery was uneventful. Microscopic study revealed gastric and ileal mucosa in the diverticulum. No ulcer was found.

CASE 6. A 24 year old man gave a history of recurrent abdominal symptoms for nine years. At the age of 15 he had had attacks of periumbilical pain aggravated by eating. He again had recurrent bouts of a similar nature when 21 years old. A year later, an episode of vomiting was followed by passage of a large amount of bright blood from the rectum. He was hospitalized and treated with blood transfusions. Pain and vomiting continued and he had passed blood per rectum twice in the four months prior to the present admission. Roentgenograms after a barium meal revealed a small pouchlike projection of retained barium in the right lower abdominal quadrant which led to a tentative diagnosis of Meckel's diverticulum. Celiotomy was carried out with excision of a Meckel's diverticulum, the site of which was not recorded. The diverticulum was 16 cm. in length and 4 cm. in width. In the midportion, a constriction completely obliterated the lumen. Recovery was uneventful. Heterotopic gastric mucosa was demonstrated microscopically. No ulcer was found.

CASE 7. A 4 month old girl was admitted after having four bloody stools in 24 hours. The general physical examination was normal except for marked pallor. Diagnosis of intestinal tumor, polyp, or Meckel's diverticulum was made. Celiotomy showed a small diverticulum 1.2 cm. in length arising from the antimesenteric border of the ileum. It was excised, and her recovery was uneventful. Microscopic examination showed no evidence of inflammation. Unfortunately no mention was made of the type of mucosa, and the slide and specimen are not available for review.

Gastric mucosa was found in all except Case 7 which was included because of the typical symptomatology which was relieved by operation. When found, the ulcer was located in the adjacent mucosa, not in the gastric mucosa itself. Ulceration is thought to result from the peptic activity of pepsin-hydrochloric acid. By analysis of secretions from Meckel's diverticula with umbilical communication it has been shown by several investigators (as quoted by Lindau and Wulff)[5] that heterotopic gastric tissue is capable of producing pepsin and hydrochloric acid. Matthews and Dragstedt[6] demonstrated that the peptic effect of gastric secretion was greater on mucosa with increasing distance from the stomach. The entrance of food into the stomach stimulates secretion from the heterotopic gastric tissue at a time when the ileum is relatively empty and factors of neutralization are lacking. Failure to find the ulcer in four of the cases does not preclude the possibility of ulceration since the ulcer

may have been located in the adjacent ileum. Cases illustrating such a situation have been reported by Coventry and Maddock[7] and Dragstedt.[8]

Case 6 emphasizes that the disease is not limited to infancy. A very similar case has been reported by Hallendorf and Lovelace.[9]

Painless massive bowel hemorrhage with absence of positive physical findings was sufficient to lead to the correct preoperative diagnosis of five of six infants. The diagnosis was considered in the sixth.

Although it is frequently stated that x-ray is of little value in the diagnosis of Meckel's diverticulum, roentgenograms following barium meal suggested the correct diagnosis in Case 6. The diagnosis was made by x-ray study in a second case which was included in the Incidental Group and has been reported elsewhere.[10]

Peptic Group Without Hemorrhage

Case 8. A 17 year old girl complained of constant dull pain in the right lower abdominal quadrant for seven months. Nausea had occurred on one occasion, and eating had no effect on the pain. Menstrual history was normal. Examination showed moderate tenderness in the right lower quadrant. The temperature was 100.2 F. The leukocyte count was normal. At laparotomy a diverticulum of the ileum was found some 90 cm. proximal to the ileocecal valve. It measured 5 cm. in length with a 3 cm. base. Microscopic study revealed a mixture of gastric and ileal mucosa without ulceration. Recovery was uneventful.

Case 9. A 25 year old man had had six episodes of periumbilical pain associated with nausea during the previous two years. The attacks had lasted for two to three hours and were followed by residual soreness in the right lower abdominal quadrant. Diarrhea sometimes accompanied the pain. Culture of the stools on several occasions was negative for pathogens. A typical attack had occurred two days before admission. Examination showed tenderness on the right side on rectal examination. The temperature was 98.2 F. and the leukocyte count was 12,700. At laparotomy a diverticulum which measured 2 cm. in length and 1 cm. in diameter was found attached to the side of the ileum approximately 90 cm. proximal to the ileocecal valve. The diverticulum was excised and appendectomy performed. Recovery was uneventful, and there has been no recurrence of pain. Microscopic study showed the presence of both ileal and gastric mucosa. The appendix was normal.

Case 10. A 14 year old boy had three attacks of pain in the right lower abdominal quadrant over a period of several months prior to admission. The last attack, of six hours' duration, was accompanied by nausea. Tenderness over McBurney's point and in both costovertebral angles was elicited. The temperature was 101.3 F. and the leukocyte count was 7000. Laparotomy revealed a 3 cm. diverticulum arising from the antimesenteric border of the ileum 20 cm. proximal to the ileocecal valve. The diverticulum was excised and appendectomy performed. Recovery was uneventful and pain was relieved. Microscopic examination showed areas of gastric mucosa in the diverticulum. No inflammation was found in the appendix or diverticulum.

The production of recurrent periumbilical and right lower quadrant pain by a Meckel's diverticulum containing gastric mucosa has been described by several authors.[4,11,12] It has been attributed to the production by the gastric mucosa of pepsin-hydrochloric acid. Sibley[12] suggested that the secretion caused irritation of the diverticulum and ileum producing muscle spasm in these structures. The pain may be aggravated by the intake of food. In the cases in this series no other cause for the pain could be demonstrated, and in the two cases for which follow-up is available no recurrence of pain has occurred.

Diverticulitis Group

The symptoms and signs found in this group have nothing to distinguish them from other acute or chronic intra-abdominal inflammatory processes.

Case 11. A 53 year old man had the onset of generalized abdominal pain 24 hours prior to admission. The pain was intermittent in character and localized in the right lower abdominal quadrant. Vomiting occurred several times after the onset of pain. Fifteen years previously he had had a similar attack lasting 24 hours. Slight jaundice had been present on two occasions in the past few years. Examination showed tenderness over the gallbladder region and over McBurney's point, with rebound tenderness in the right lower quadrant. The temperature was 98.2 F. Leukocyte count was 11,800. Laparotomy was performed and a moderate amount of cloudy peritoneal fluid found. A tense, acutely inflamed, 8 cm. Meckel's diverticulum adhered to the ileum by inflammatory adhesions was discovered. Edema extended into the walls of the ileum. A resection of 20 cm. of ileum containing the diverticulum was carried out and continuity restored by end-to-end anastomosis. Convalescence was complicated by obstruction from adhesions which were lysed 12 days postoperatively. Microscopic examination showed acute inflammation of the walls of the diverticulum with gangrene at the tip.

Case 12. A 33 year old man had paroxysmal cramping pain in the right lower abdominal quadrant for 16 hours. Vomiting occurred several hours after the onset of pain. Examination led to a preoperative diagnosis of acute appendicitis. Temperature was 99.3 F. A moderate amount of clear peritoneal fluid was found at exploration and a 4 cm. Meckel's diverticulum was excised. A normal appendix was also removed. Uneventful recovery followed. Microscopic study of the diverticulum showed round cell and polymorphonuclear infiltration of the walls.

Case 13. A 15 year old girl had recurrent episodes of pain in the right lower abdominal quadrant accompanied by nausea for six months. Slight tenderness in the right lower quadrant was elicited. The temperature was 100.0 F. and the leukocyte count was normal. On laparotomy a diverticulum 10 cm. long was found arising from the ileum approximately 42 cm. proximal to the ileocecal valve. Diverticulectomy and appendectomy were performed. Uneventful recovery followed. Microscopic examination showed congestion and diffuse scattering of lymphocytes and erthrocytes throughout the walls. The appendix

was normal. At examination three and a half years later she had complete relief of symptoms.

Discussion

The presence of an undiseased Meckel's diverticulum does not produce symptoms in most cases. However it may become the lead point of an intussusception although it is not diseased. If there is attachment to the umbilicus intestinal obstruction is more likely since the connection may act as an axis for kinking or volvulus. Obstruction may also be produced by adhesions around a free floating diverticulum, or the diverticulum itself may become entwined around the small bowel. Tumors in the diverticulum may cause obstruction. The diverticulum may be the site of acute or chronic inflammation which may progress to gangrene and peritonitis. No satisfactory method is available for differentiating diverticulitis from other intra-abdominal inflammatory processes.

Heterotopic gastric tissue in the diverticulum frequently produces symptoms. Ulcer-like symptoms may result presumably from the action of acid on the small bowel mucosa. Ulceration may be associated with the heterotopic tissue, in which case profuse bleeding may be found. This symptom complex is most frequently found in small children though it may occur later in life.

The etiology of massive intestinal hemorrhage presents a diagnostic problem for the surgeon and practitioner especially when there is no history of pain, no vomiting, and no x-ray evidence of peptic ulcer. Polyps, hemangiomata, congenital deformities, blood dyscrasias, hemorrhoids, carcinoma, and diverticulosis of the colon are some of the conditions which may produce this type of bleeding. Some cases will remain undiagnosed.

Stone[13] has reported 31 cases of large melena in which the cause of bleeding could not be determined by usual diagnostic means. All responded favorably to conservative therapy. It is to be noted, however, only three of the patients were less than 15 years old. In two of these patients celiotomy was not done, and the follow-up was less than one year. An operable lesion may have been present. The third patient, aged 9 years 10 months, was subjected to celiotomy twice, no lesion being found. Stone has reported an additional series of cases in which diverticulosis of the colon as demonstrated by x-ray was the probable cause of bleeding.

Minimal or profuse bleeding may be caused by polyps and tumors of the small bowel. Variable degrees of abdominal pain may be associated with these lesions. X-ray is of aid in establishing the diagnosis. Congenital duplications of bowel may cause bleeding of the

adjacent alimentary tract by pressure necrosis of blood vessels and are frequently associated with obstructive symptoms. An exact preoperative diagnosis in these conditions, when bleeding has been severe, is not necessary since surgical excision of the offending lesion is indicated in both as soon as the patient has been properly prepared by supportive measures.

Intussusception may produce bowel hemorrhage. A history of pain and palpation of a mass help to differentiate this condition from Meckel's diverticulum. Typically, recurrent colicky abdominal pain precede the passage of bloody stools in intussusception. Ladd and Gross[14] have reported the finding of a mass by abdominal or rectal examination in 85 per cent of cases.

Polyps of the descending colon, sigmoid, and rectum tend to bleed because of irritation by solid fecal material, but the bleeding is usually of small amount and is usually found on the surface of the stool. Sharp foreign bodies in the rectum also may produce bleeding. These conditions can usually be diagnosed by proctosigmoidoscopic examination or barium enema.

Bowel hemorrhage due to blood dyscrasias is diagnosed by the proper clinical and hematologic tests.

Because of the multiplicity of complications which may occur, the Meckel's diverticulum which is encountered incidentally at operation should be excised if the patient is in good condition. In the hands of competent surgeons the procedure is innocuous.

Summary

1. Thirty cases of Meckel's diverticulum have been reviewed. The ratio of males to females was 1:1.5.

2. Symptoms were produced by the diverticulum in 13 of the 30 patients. Heterotopic gastric mucosa or inflammation was found in the diverticula in only 2 of the 17 patients who had no symptoms.

3. Six infants and one adult had hemorrhage associated with the Meckel's diverticulum. Gastric mucosa was found in 6 of the 7 cases; ulceration in 3. The syndrome of massive bowel hemorrhage without pain or positive physical findings was sufficiently characteristic to lead to the correct preoperative diagnosis in 4 of the 5 infants.

4. Three patients without hemorrhage had recurrent abdominal pain associated with heterotopic tissue in the diverticulum.

5. Inflammation of Meckel's diverticulum was found in 3 patients who had symptoms of an intra-abdominal inflammatory process. The symptoms were of variable duration.

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CARCINOMA AT THE CONFLUENCE OF THE HEPATIC BILE DUCTS

A Case Report*

GILMAN E. SANFORD, M.D.**
C. C. LOWRY, M.D.**
Memphis, Tenn.

CARCINOMA of the extra-hepatic bile ducts is quite rare. It is reported as occurring in from 0.022 to 0.028 per cent of autopsies.[1,5,8] Marshall[7] reported 34 cases in 22,000 operations on bile ducts. Stewart and Lieber[8] analyzed 104 cases and gave references to 211 others in a complete review of the literature in 1940. Few cases have been reported since that time.[4] The most common sites of carcinoma in the extra-hepatic bile ducts in their order of frequency are: 1. The common bile duct; 2. the junction of cystic, common hepatic, and common ducts; and 3. the common hepatic duct. The confluence of the right and left hepatic ducts is the rarest site. Carcinoma at this location has been reported as occurring in from 4 to 12 per cent of carcinomas of the extra-hepatic bile ducts.[1,6,8] Less than 40 cases have been reported to date.

Carcinomas of the extra-hepatic bile ducts are usually constricting annular lesions, and may be mistaken for benign strictures. There is a difference of opinion concerning the frequency of metastasis. Metastasis has been reported in 23 to 75 per cent of the cases.[1,6,8] Stewart and Lieber in the largest series reported an incidence of 52.3 per cent.[8]

The age and sex incidence are the same for all bile duct carcinomas. The average age incidence is 56 to 59 years, and 57 to 65 per cent of the reported tumors have been in males.[1,8]

Jaundice has been the first symptom in the majority of cases, and it is present at some time in all cases. The principal signs and symptoms in their order of frequency are: jaundice, loss of weight and strength, pain, pruritis, anorexia, fever, vomiting, diarrhea, constipation, and enlargement of the liver. Laboratory findings are usually indicative of obstructive jaundice, although at times evidence of hepatocellular damage makes differentiation difficult. Correct clinical diagnosis has been made in only 20 per cent of the cases, and correct diagnosis, at laparotomy, has only been made in 36

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**Surgical Service, Veterans Administration Medical Teaching Group, Kennedy Hospital, Memphis, Tennessee.

per cent of the cases. The most common preoperative diagnosis has been carcinoma of the head of the pancreas.

The condition has been uniformly fatal, although a few months' palliation has been obtained surgically in some cases.

Case Report

W. C. M., a 33 year old white male, was admitted to Kennedy Veterans Hospital Jan. 14, 1948, with marked jaundice. His illness had begun 4 months previously when he noticed weakness, nervousness, generalized malaise, clay-colored stools, dark urine and jaundice. There was neither nausea, vomiting nor pain. Anorexia and intolerance to fatty foods, with abdominal distention developed and he began to have 4 to 5 loose, foul-smelling stools daily. Itching of the skin became intense and he lost 30 pounds in weight. Past history was irrelevant. Family history revealed that his mother had died of cancer at age 57.

Physical examination revealed marked icterus, emaciation, multiple scratch marks on skin of extremities and abdomen, many of which were secondarily infected, and enlargement of the liver to four fingerbreadths below the costal margin. The liver was smooth with a sharp edge and nontender. Temperature was 98.6° F. and pulse was 76. Laboratory findings were: erythrocytes 4,250,000; hemoglobin 12.1 Gm.; leukocytes 20,850 with 75 per cent neutrophils and 25 per cent lymphocytes; serum protein 7 mg. per cent; A-G ratio 1:3; serum alkaline phosphatase 11.3 King-Armstrong units; prothrombin time 100 per cent of normal; serum bilirubin 22 mg. per cent; cephalin flocculation negative; thymol turbidity negative; serum cholesterol 166 mg. per cent with 40 per cent cholesterol esters; erythrocyte fragility normal; gallbladder could not be visualized by cholecystogram; there was a trace of urobilinogen in the stools; the urine was strongly positive for urobilin; and stools were negative for parasites.

A diagnosis of obstructive jaundice probably due to carcinoma of the head of the pancreas was made and an exploratory laparotomy performed. At operation the liver was enlarged, mottled in appearance, but smooth to palpation. The pancreas was normal. The gallbladder was small, contracted and contained no bile. The common duct was collapsed and was also free of bile. A catheter passed freely through the common duct into the duodenum. A catheter could apparently be easily passed up either hepatic duct. When the catheter was passed up what was thought to be the right hepatic duct, 100 c.c. of clear mucoid fluid was obtained. A T-tube was inserted in the common duct. The gallbladder became filled with blood due to operative manipulation and it was removed. A biopsy was taken of the liver and the abdomen closed. The postoperative diagnosis was hepatitis or inaccessible carcinoma of the hepatic ducts.

The immediate postoperative recovery was good, but there was no decrease in the jaundice. There was a small amount of bile-stained drainage from the T-tube. Unfortunately, the patient removed the T-tube on the 8th postoperative day before cholangiograms could be made. The patient was placed on high protein, high carbohydrate, high vitamin, low fat diet. He felt well and gained in weight. He was discharged 6 weeks postoperatively.

The pathologic report on the liver biopsy was a nonspecific hepatitis (fig. 1).

Thirty days later the patient was readmitted. There had been no change

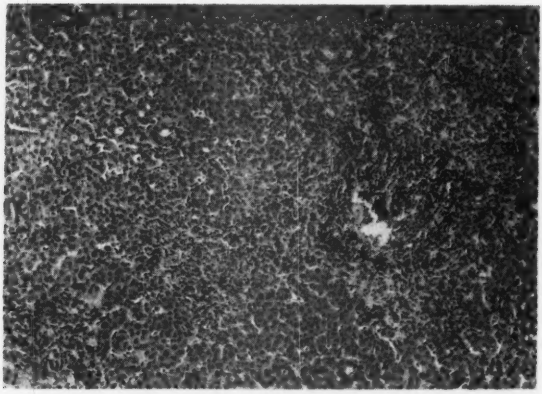

Fig. 1. Photomicrograph of liver biopsy showing chronic inflammatory changes confined primarily to portal areas.

in the icterus, the pruritis had become more severe and 2 weeks prior to readmission he had developed severe night blindness. Examination revealed marked icterus, cholemic odor to his breath, his liver was enlarged to five fingerbreadths below the costal margin and there was slight ankle edema. Temperature was 98° F. and pulse was 80. Laboratory findings were: erythrocytes 3,800,000; hemoglobin 11 Gm.; leukocytes 22,650 with 81 per cent neutrophils, 17 per cent lymphocytes and 2 per cent eosinophils; erythrocyte fragility normal; non-protein nitrogen 27 mg. per cent; serum protein 7 mg. per cent; cephalin flocculation 2 plus; thymol turbidity normal; prothrombin time 46 per cent of normal; serum bilirubin 24.4 mg. per cent; serum alkaline phosphatase 14.9 King-Armstrong units; serum cholesterol 106 mg. per cent with 20 per cent cholesterol esters.

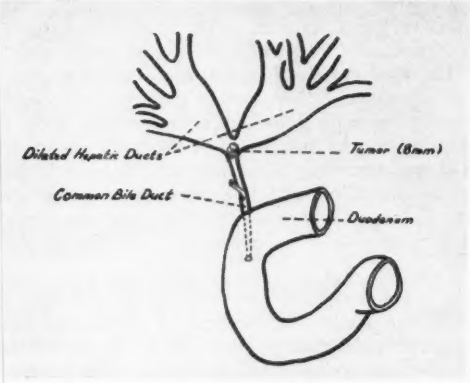

Fig. 2. Diagram showing location of tumor.

At this time the diagnosis was considered to be either an inaccessible carcinoma of the hepatic ducts or a prolonged hepatitis. The patient was placed

on strenuous liver "regeneration" therapy consisting of high protein, high carbohydrate, high vitamin, low fat diet fortified by methionine and multivitamins. Crude liver extract and vitamin K were given parenterally, and he was given whole blood transfusions. The patient's course remained unchanged for one month. The prothrombin time remained around 50 per cent of normal despite the administration of vitamin K, and the serum bilirubin around 25 mg. per cent.

Five weeks after readmission his condition rapidly deteriorated. He became stuporous and died within 24 hours.

The total duration of his disease from the onset of symptoms was 8 months. The duration after operation was 3½ months.

At autopsy, the common bile duct, the duodenum and the pancreas were normal. At the bifurcation of the hepatic duct there was an ill-defined, hard, annular growth which involved the wall of the duct and narrowed the lumen to almost complete obliteration (fig. 2). The growth measured 8 mm. in its greatest dimension. Distal to the lesion, the common hepatic duct was of normal size and contained no bile. Proximal to the lesion, the right and left hepatic ducts and all the bile radicles were greatly dilated and distended with clear, mucoid fluid (fig. 3). The liver was enlarged and weighed 3010 Gm.

Fig. 3. Photograph of the cut surface of liver showing the dilated bile radicles.

Microscopic study of the growth described above showed it to be a well differentiated adenocarcinoma (fig. 4). The carcinomatous elements were scattered diffusely through a dense fibrous connective tissue stroma. The cells contained large hyperchromatic nuclei surrounded by an indistinct, scanty cytoplasm. The individual cells varied considerably in size and shape. A few mitotic figures were seen. Distal to the lesion there was a gradual transition from cancer to normal biliary tract epithelium. Proximal to the lesion, the epithelium lining the bile ducts was atrophic. Examination of the other organs revealed no metastases.

Microscopic sections of the liver showed the normal architecture to be disrupted. The principal changes were in the portal areas where there was fibrosis and infiltration with inflammatory cells. The latter were mononuclear cells for the most part although a few polymorphonuclear leukocytes were

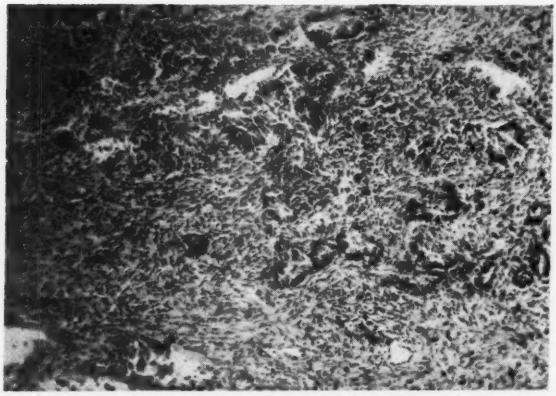

Fig. 4. Photomicrograph from the tumor. Note the glandular arrangement of the carcinoma surrounded by dense fibrous stroma.

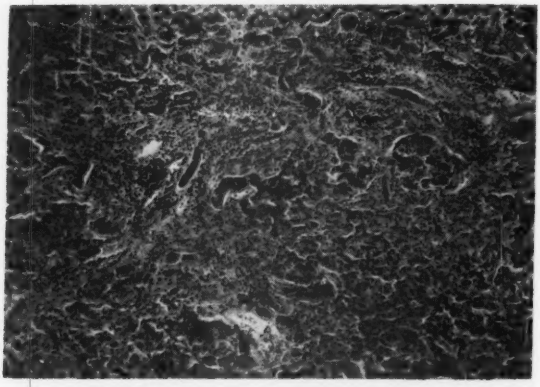

Fig. 5. Photomicrograph from liver at autopsy. Note the widespread destruction of liver parenchyma by fibrosis and chronic inflammation.

present. The liver cells were bile-stained and showed degenerative changes. These findings were interpreted as showing chronic, nonspecific hepatitis and early cirrhosis of the liver (fig. 5).

Comments

This case demonstrates how an extremely small, nonmetastasized adenocarcinoma of the bile ducts was capable of producing a fatality because of its location at the junction of the hepatic ducts. Complete obstruction of the bile passages resulted, which caused death by denying the gastro-intestinal tract the important digestive function of bile and eventually by destroying the physiologic response of the liver cells above the lesion.

Clinically, it was impossible to diagnose the site of this lesion, although malignancy was correctly suspected before operation. The exact nature of the disease could not be demonstrated at the time of abdominal exploration, but we are of the opinion that the findings allow by deduction the correct site of the lesion and perhaps even its malignant nature. It was known from a study of the function of the liver that infectious hepatitis was unlikely. Significant operative findings were: 1. collapsed gallbladder without gross evidence of infection or stones; 2. collapsed common duct without evidence of infection or stones; 3. patent opening of the common duct at the ampulla of Vater. These three findings indicated that the site of obstruction must be above the common duct. The operator felt that he had successfully probed both hepatic ducts, but the autopsy findings suggest that the probe did not enter either hepatic duct proximal to junction because of the obstructing nature of the tumor at that site. This exploratory probing was necessarily blind when the ductal junction was located in the substance of the huge liver, and was accordingly subject to erroneous interpretation. No bile was noted to enter the common duct, which would mean that the disease was obstructing both hepatic ducts simultaneously and completely. In the absence of other gross findings, one can deduce the site to be at or near the junction of the hepatic ducts. It is known clinically that abscesses, metastases or hepatomas do not usually block both hepatic ducts completely. Therefore the only lesion capable of producing this clinical picture would be carcinoma of the bile ducts at the junction of the right and left hepatic ducts.

Summary

A case of adenocarcinoma at the confluence of the hepatic ducts is reported. The case was first seen 4 months after onset of jaundice. A diagnosis of obstructive jaundice was made, but no obstructive lesion was found at laparotomy. Biopsy of the liver was reported as nonspecific hepatitis. Autopsy 3½ months later revealed a carcinoma 8 mm. in diameter at the confluence of the hepatic ducts, chronic nonspecific hepatitis, and early cirrhosis of the liver.

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AN EXPERIENCE WITH THE PERITONEAL-BUTTON OPERATION FOR ASCITES

AMOS R. KOONTZ, M.D.
Baltimore

BOTH successful[1,2] and unsuccessful[3] experiences with the Crosby-Cooney[4] glass button operation for ascites have been reported in the literature. These reports have led me to report a case which was neither entirely successful nor entirely unsuccessful:

Mrs. I. P., white, 44 years old, was first seen by me on Oct. 13, 1948. She had been operated upon elsewhere in March 1948 for carcinoma of the ovary. At the time I saw her, her abdomen was very large and full of fluid. She had been tapped three times since her operation in March.

On October 14 I operated on the patient at the Church Home and Hospital under sodium pentothal and cyclopropane anesthesia. A lower left rectus incision was made. A small opening was made in the peritoneum and 6,400 c.c. of ascitic fluid were withdrawn. A Crosby-Cooney button was inserted in the manner described by them. Approximately 20 square inches of the rectus sheath surrounding the button were excised, well exposing the muscle for the absorption of ascitic fluid according to the method of Lord.[5] The subcutaneous tissue was closed with medium black silk, continuous, and the skin with fine black silk, continuous. The patient was discharged from the hospital two days after operation.

On October 23, there was a subcutaneous collection of fluid in the area in which the rectus sheath had been excised. This was aspirated with a 16-gauge needle on a 3-way syringe, and 1,300 c.c. of serous fluid were removed.

Similar aspirations were also performed as follows:

October 29—2,700 c.c.
November 3—1,800 c.c.
November 10—2,070 c.c.
November 17—970 c.c.
November 24,—1,380 c.c.
December 10—1,860 c.c.
December 23—1,750 c.c.

The patient died on Dec. 27, 1948.

It was my feeling that some of the ascitic fluid was absorbed from the subcutaneous space, but that the absorption was not sufficient to keep pace with the production of fluid in the abdominal cavity. The patient was aspirated oftener than was absolutely necessary as is shown by the relatively small amounts of fluid withdrawn each time. However, she insisted upon being aspirated as soon as her abdomen got the least bit full, as she was much more comfortable with the abdomen empty. During each aspiration pressure on the abdominal wall would make the subcutaneous space fill with fluid after it had been apparently emptied. This showed that there was free communication between the abdominal cavity and the subcutaneous

space through the glass button. Certainly it was easier to aspirate fluid repeatedly from the subcutaneous space than it would have been to do repeated abdominal paracenteses had the glass button not been put in.

Welch[3] has reported two cases which came to autopsy after the insertion of the peritoneal button, and both of these cases showed a dense fibrous wall lining the subcutaneous cystic space, from which he felt there could have been little absorption. He thought that the fibrous wall represented an attempt at repair of the operative trauma. As no autopsy was obtained in my case, I have no way of knowing what the nature of the lining of the subcutaneous space was. There may have been considerable fibrosis in my case also. It is obvious, too, that it was impossible to determine how much absorption there actually was from the subcutaneous space.

SUMMARY

A case is presented in which a Crosby-Cooney operation was done according to the modification of Lord. While the operation was not successful in relieving the ascites, further paracenteses were obviated as it was possible to aspirate the fluid from the subcutaneous pocket which communicated with the peritoneal cavity through the glass button. How much absorption was actually effected from the pocket, it was impossible to determine.

1014 St. Paul Street.

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TOXIC SUBLINGUAL GOITER

GRAY C. BUCK, JR., M.D.
ROBERT F. GUTHRIE, M.D.
Birmingham

HYPERTHYROIDISM produced by true aberrant thyroid tissue has not been reported in the available literature. In the present case, toxic symptoms were produced by a sublingual ectopic goiter, the surgical removal of which resulted in the alleviation of these symptoms.

True aberrant thyroid glands develop from embryonic rests and unlike the false aberrant thyroids have no direct glandular or fibrous connection to the normal gland. Their abnormal locations can be explained when one reviews the embryonic development of the thyroid. The early pharynx gives off in the median ventral line a column of cells which grows downward as a cylindrical mass through the hind part of the tongue into the neck. Here, it branches out in front of the trachea to form the normal thyroid gland. The connecting column of cells eventually disappears but a blind pit remains at the back of the tongue called the foramen cecum. Some investigators believe that thyroid tissue can arise from the postbranchial bodies, or the fifth pouches, and use this theory to explain the lateral ectopic forms, but this is not generally accepted.[1]

Since the hyoid bone in its early stages crosses the line of descent of the thyroid primordium, 40 per cent of all embryonic thyroids become entangled with the developing hyoid.[2] This causes such interference that the thyroid's descent may be obstructed and diverted into lingual or sublingual regions. From this same interference, the sinuses of thyroglossal cysts (remnant of thyroglossal duct) sometimes pass through the body of the hyoid; however, they more commonly pass anteriorly or posteriorly to it. As one can see from Figure 1, remnants of the thyroid can be left behind anywhere along the journey from the pharynx to the lower neck. Sometimes, the cells do not stop in the neck but migrate downward to substernal and even pericardial positions. Thyroid tissue has been found in the nasopharynx, trachea, esophagus, lateral cervical regions, and in the hyoid bone. When remnants of thyroid tissue persist at the foramen cecum, they are called lingual thyroids; when within the tongue, intralingual; when below the tongue, sublingual; when in front of the larynx, prelaryngeal; when in the normal position anterior or lateral to the upper rings of the trachea they are called

From the Department of Surgery, Medical College of Alabama, Birmingham.

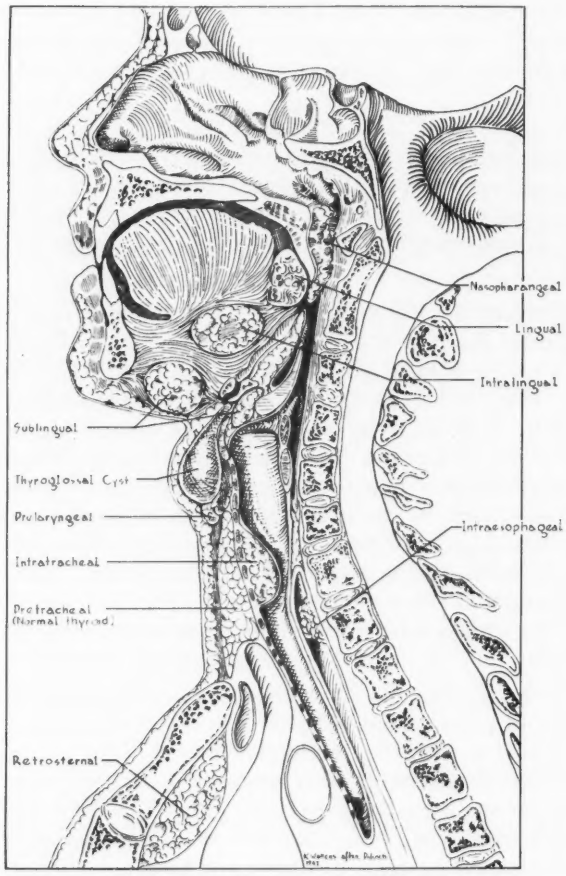

Fig. 1. Aberrant Thyroids.

pretracheal; and those in the superior mediastinum behind the sternum, retrosternal thyroids.[3]

In the event that a deficiency of the normal thyroid occurs (surgically or otherwise) these embryonic rests often grow and compensate for it. These developments are thus not to be regarded as new growths. Ectopic tissue may function so well that a congenital absence of the normal thyroid may never be known. However, the realization of such a condition may come when special stress such as puberty, pregnancy or lactation exists, and excites hypertrophy and hyperplasia of the aberrant tissue.[4]

Small accessory thyroids occur frequently in the midline of the neck in a rosary-like chain of small glands and are often mistaken

for enlarged lymph nodes if they are not examined microscopically. When so examined, the picture is usually that of normal thyroid tissue; although cases of the colloid nodular type, primary carcinoma and lymph node metastatic thyroid nodules have been reported.[5] These latter two possibilities must be considered in all instances of aberrant thyroids. Also to be considered in these cases of cervical masses are thyroglossal duct cysts, dermoids, lingual tonsils, hygromas, salivary cysts, hemangiomas, and lipomas. Hyperthyroidism, interestingly enough, can be produced by metastatic thyroid nodules especially if the cells are of the cylindrical or columnar type.

The ectopic gland is sometimes the only thyroid tissue present and thus has the sole function of the thyroid; whereas, in other instances, the ectopic gland is an accessory to tissue in the normal location or to tissue in other abnormal places. Consideration of these factors is important when one has to anticipate the development of myxedema when the abnormally placed gland is removed.[6] The surgeon should first explore the usual site, and then, if necessary, make a separate incision to remove the ectopic tissue completely. One does not have to be concerned about excising the parathyroids in removing aberrant thyroids unless the ectopic tissue lies close to the site of the normal gland. The parathyroids develop from the third and fourth branchial pouches and are entirely separate from the thyroid in embryonic life. They become attached to the capsule of the normal thyroid. If the thyroid is absent from its normal location, the parathyroids are found attached to the connective tissue elements of the sublaryngeal area.

In a review of the literature, many reports have been encountered regarding aberrant thyroids but there is no record of toxic aberrant goiters. Rienhoff reports that he and his associates were unable to find any record of the occurrence in the true aberrant thyroid tissue of any condition other than a simple goiter, excepting a case of ligneous thyroiditis and a case of carcinoma of a lingual goiter.[7] No cases of Basedow's disease developing in true aberrant thyroid tissue could be found. The lingual and intralingual glands seem to be those about which the most has been written.[8] Cattell found two lingual thyroids in 7,600 thyroid operations at the Lahey Clinic, and Ulrich found two lingual thyroids in 4,000 thyroid operations at the University of Pennsylvania Hospital. None of these was reported as toxic and the symptoms were of an obstructive nature.[9] This case reported here is unusual because of the discovery and removal of a toxic sublingual goiter after three previous surgical procedures on the thyroid gland at its normal site. It serves as a reminder that ectopic thyroid tissue should be considered and looked for in cases of recurrent hyperthyroidism after thyroidectomy.

Because of the three previous surgical procedures on the thyroid gland, the possibility of an elongated isthmus having been left behind is a very real possibility. The surgeon feels quite certain that this was not the case since he could find no scar tissue or connective tissue connection with the previous operative site, and since the ectopic tissue was sharply localized around the hyoid bone and was well away from the previous low cervical incisions.

Case Report

Mrs. R. C., a 58 year old white female, was admitted to the Jefferson-Hillman Hospital on Nov. 6, 1946, for her fourth thyroidectomy. She had had subtotal thyroidectomies in 1938, 1940 and 1944. With each episode, she had classic signs and symptoms of a toxic goiter. The patient has exhibited a moderate exophthalmus since her first illness.

The patient stated that 10 months before her last hospital stay she again noted nervousness, tremor of the hands, inhibition, and increased appetite with a weight loss of 12 pounds, muscular weakness, increased perspiration, palpitation and a slight increase in her exophthalmus. Soon after the onset of the symptoms, she noticed a lump just under her chin in the midline of her neck. She states that the mass increased in size and that her symptoms gradually increased in severity. She then developed occasional attacks of orthopnea, dyspnea and slight ankle edema.

The past history was negative except for the present illness. The family history was also non-contributory. She is the mother of 4 children.

Physical examination revealed that the patient was a well-developed, well-nourished, white female who was quite restless and excitable. Her blood pressure was 176/138, her pulse 102, and her respiration 20. There was a mild exophthalmus and there was a palpable mass in the midline of the neck at the level of the hyoid bone. The approximate measurement of this mass was 3.4 by 2 by 1 cm. An operative scar was at the base of the neck anteriorly. The heart and lungs were negative except for tachycardia. There was a fine tremor of the extended hands and a moderate weakness of the quadriceps muscles. Direct laryngoscopic examination revealed normal vocal cords. Routine laboratory work was essentially negative, but her BMR average was a plus 54 per cent.

Two months before surgery the patient was placed on a 0.2 Gm. of thiouracil three times a day until the BMR reached zero. On this therapy the sublingual mass became slightly smaller. Lugol's solution, 10 minims three times a day, was started and three days later the thiouracil was stopped. She was operated upon on Nov. 11, 1946, ten days after starting Lugol's solution and two months after starting thiouracil, with a BMR of —7.9 per cent.

Under 1 per cent novocaine locally, the old scar was excised and the normal site for the thyroid gland was explored. Only three small remnants of the thyroid gland were found and the largest of these was removed. After closing the lower cervical incision another transverse incision was made over the hyoid bone under a supplement of sodium pentothal anesthesia, and a sublingual goiter measuring 3 by 2 cm. by 6 mm. was dissected free, demonstrated and excised. The upper pole extended posteriorly to the hyoid bone and cephalad

to the level of the superior margin of the body of the hyoid bone. The capsule of the upper portion of the mass was continuous with the capsule of the cystic mass which resembled a thyroglossal cyst. The thyroglossal cystic structure extended for 1.5 cm. above the hyoid bone into the muscles of the tongue in the direction of the foramen cecum. This transverse incision was closed by layers with interrupted fine black silk sutures.

The patient's postoperative course was uneventful and on dismissal she was advised to take 20 minims of Lugol's solution daily for 2 months and then 10 minims daily for an additional 10 months. The patient's basal metabolism was plus 4 on Jan. 8, 1947, and she was free from any toxic symptoms.

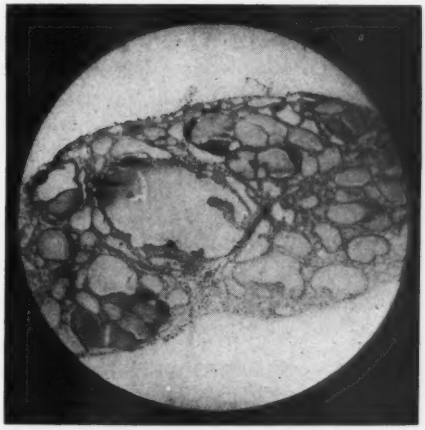

Fig. 2. Hyperplasia and involution after thiouracil and iodine.

The pathologic report describes the specimen as firm, reddish-pink tissue measuring 2 by 3 cm. by 6 mm., resembling thyroid and weighing approximately 3 Gm. Microscopically, the sections were of thyroid, showing hyperplasia of the epithelium in many places. The cells were tall, columnar in type, with clear areas surrounding the cells. Many of the acini had papillary projections. Several areas of lymphoid tissue were in the section and there were two areas which contained rather large cells with light-staining nuclei arranged in solid masses. The diagnosis was a primary hyperplasia of the thyroid with no suggestion of malignancy. Figure 2 is a microphotograph of this aberrant sublingual goiter. One must remember that this patient received iodine prior to surgery and that this drug causes involution of the hyperplastic thyroid gland.

Conclusion

This is a brief review of aberrant thyroids with the presentation of an interesting toxic sublingual goiter. As already stated, this is an abnormal position for thyroid tissue and the present case is most extraordinary not only because of its location but because of its hyperplasia and production of hyperthyroidism.

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OBSERVATIONS ON A METHOD FOR THORACO-LUMBAR SYMPATHECTOMY

CHARLES E. TROLAND, M.D.
Richmond

THE surgical treatment of hypertension has received a great deal of attention during the past 15 years. The sympathetic nervous system, particularly that part of this system innervating the abdominal area, has been the focal point of this attention and a variety of procedures have been proposed to eradicate sympathetic influence on the splanchnic bed and abdominal organs. The value of any operative intervention in the treatment of hypertension has been questioned in some quarters, but it is the firm opinion of the writer that sympathectomy is the treatment of choice for properly selected hypertensive patients. It seems most probable that some other treatment, either medical or surgical, will eventually supplant this rather formidable procedure but such treatment is not at present available. However, it is not the purpose of this report to advance further data in support of dorsolumbar sympathectomy in the treatment of hypertension but rather to advocate a surgical approach which, if sympathectomy has been decided upon, will secure the desired denervation with a low mortality and morbidity.

The operative procedures designed to accomplish sympathetic denervation of the splanchnic bed can be roughly divided into two groups: limited denervations and more extensive denervations. The limited denervations include the celiac ganglionectomy of Crile,[2] the supradiaphragmatic approach of Peet[7] and the subdiaphragmatic operation introduced by Craig.[1] The combined supra-/and infradiaphragmatic approach of Smithwick[9] must also be classed with the limited denervations when it is compared with the second group of extensive sympathetic denervations. The prime examples of the more extensive operations are the procedures advocated by Poppen[8] and Grimson,[4] the latter being an almost total sympathectomy. All of these operations have been completely described and illustrated in the literature so further comment upon them will not be made. In 1946 Hinton and Lord[6] proposed resection of the entire ninth or tenth ribs and noted the excellent visualization of the structures to be removed that was obtained. This procedure, with minor variations, is the operation advocated in the present paper and will therefore be briefly outlined.

The operation is performed in two stages and as a matter of

From the Department of Neurological Surgery, Medical College of Virginia, Richmond, Virginia.

routine the right side has always been done first. The patient is placed directly on his side with the tenth rib directly over the kidney rest or point at which the operating table can be broken. The kidney rest is then raised or the feet and head lowered, producing a flaring-open of the rib cage in the operative region. Proper positioning of the patient is an important point in securing adequate operative exposure. An incision is made over the entire course of the tenth rib, beginning about 5 cm. lateral to the vertebral column. The entire rib, or at least the major portion of it, is then removed after sectioning the overlying muscles. Only a small portion of the sacrospinalis muscle is sectioned as adequate exposure can be obtained without completely dividing this muscle. The underlying pleura is then dissected away from the chest wall. After dissection has been started in the proper plane of cleavage, it has been found that gentle finger dissection expedites rapid and safe exposure. An extremely important point in securing good exposure is adequate separation of the pleura from the diaphragm. The lung with the overlying pleura is then gently retracted with a Richardson retractor, exposing the entire splanchnic nerves and the major part of the thoracic sympathetic chain. The splanchnic nerves are freed from their bed by blunt or sharp dissection and the celiac ganglion is pulled up into the thorax by traction on the greater splanchnic nerve. A portion of this ganglion is usually removed in the sectioning of the end of the greater splanchnic nerve. The sympathetic chain is then isolated by dividing the rami entering the ganglia, the dissection extending above the uppermost ganglion sending fibers to form the greater splanchnic nerve. This usually entails removal of the ganglia up to T-6 or T-5. In one patient who had previously undergone an upper dorsal sympathectomy for Raynaud's disease the dissection extended high enough to include a clip placed below the third thoracic ganglion.

Upon the conclusion of the thoracic portion of the operation the diaphragm is sectioned from the sympathetic trunk outwards. Although Hinton sections most of the diaphragm in a curvilinear fashion this has not been found to be routinely necessary. At any rate a sufficient extent of the diaphragm is sectioned to provide good visualization of the lumbar sympathetic trunk which is isolated below the second lumbar ganglion and sectioned at that level. It is entirely feasible to explore the renal and adrenal regions by this approach although this has not been routinely performed. Large incisions in the diaphragm have been sutured but no attempt has been made to close small openings.

The muscles and skin are then closed in anatomic layers and the extrapleural space is aspirated by means of a catheter. If the pleura

has been opened, as frequently occurs in this procedure, a second catheter is used to aspirate the pleural cavity. It has not been noted that opening the pleura has any deleterious effect, provided the lung is expanded thoroughly at the conclusion of the operation. The reader is referred to the excellent illustrations in the original article by Hinton and Lord.[6]

In considering any operative treatment for hypertension there are three prime considerations. Firstly, the mortality attending the procedure is naturally important. The operation outlined here has been performed on 38 patients with one hospital death. This patient, a 34 year old male, went into a complete renal shut-down three days after the second stage operation and shortly after a reaction to a transfusion of whole blood. Postmortem examination indicated that the transfusion played a major part in the fatal outcome. Thus, although this death must of course be considered as an operative fatality, it is not felt that it resulted from the type of operative procedure performed. It seems certain that this type of sympathectomy has a high degree of safety.

Secondly, the morbidity is a matter of great importance. There is a natural tendency for the surgeon to consider the operative procedure without due regard for the pain, general discomfort and disability following operation. The internist and practitioner who are principally in charge of the patient during his convalescence are acutely aware of these considerations as is indicated by the recent report of Evans and Bartels.[3] In the 38 cases here reported there were two instances of serious postoperative complications. One patient had a wound infection following the second stage operation that necessitated a hospital stay of 45 days from the time of the first operation. In another patient there was a persistent accumulation of fluid following the first stage operation. Although this pleural effusion caused only very slight respiratory embarrassment it was resolving very slowly in spite of aspirations and it was not deemed safe to perform an intrathoracic procedure on the other side. Therefore a subdiaphragmatic splanchnicectomy was carried out 21 days after the original operation, the patient leaving the hospital 12 days later.

The length of time between the two stages of the sympathectomy can also legitimately be considered under the general heading of morbidity as the general condition of the patient is the determining factor in fixing this interval. The usual interval has been 7 days and the longest interval was 21 days in the patient with the pleural effusion. The average interval between stages, not including that one case, was 8 days. The average stay in the hospital from the time of the first operation to discharge was 19 days. In short, the

vast majority of patients undergoing this type of operative treatment for hypertension can expect a relatively short hospital stay, a matter of considerable import in view of present hospital costs.

The very definite impression has been gained that postoperative pain is less severe and of shorter duration than that following the classic Smithwick procedure. Although the procedure has not been performed long enough to judge the total time needed for full economic rehabilitation, it is possible to state that of 25 patients traced, 18 have returned to their former occupations in 5 months.

The third prime consideration in evaluating a sympathectomy is the question of the completeness or adequacy of the procedure. There is a mounting body of evidence indicating that the principal beneficial effects of sympathectomies arise from the production of orthostatic hypotension. This has been produced in every case in this series. It is also felt that the procedure is of sufficient extent to mitigate regeneration. The aortico-renal plexus is also decentralized, satisfying the criteria of Heinbecker.[5]

In summary the operative procedure of splanchnicectomy and thoracolumbar sympathectomy as introduced by Hinton and Lord[6] and slightly modified here is strongly recommended as providing an extensive and entirely adequate sympathetic denervation with a low mortality and minimal morbidity.

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RECONSTRUCTIVE SURGERY OF CONGENITAL AND TRAUMATIC DEFORMITIES OF THE FACE

T. G. Blocker, Jr., M.D.*
Galveston, Texas

Reconstructive surgery of the face is chiefly concerned with congenital lesions and either primarily or secondarily with burns and other types of acute trauma.

While such purely cosmetic operations as face-lifting and improvement of nasal contour receive wide publicity, they form the least important part of plastic surgery and afford the smallest amount of satisfaction to the surgeon himself. We make it a general practice in our institution to refer to a psychiatrist all patients without defects which are actually disfiguring from the viewpoint of the casual observer for a general personality evaluation before any cosmetic surgery is undertaken. Many persons who are merely vain and self-centered or who are actually poorly adjusted individuals are inclined to blame their features for their failure to achieve what seem to them important and worthwhile goals. Plastic surgery is not the answer to the search for the "Fountain of Youth," but it has much to offer in the relief of deformities which may of themselves produce personality disorders or may have important social and economic significance to the patient.

The most common congenital lesions of the face are single or double harelip, cleft palate, moles and other benign tumors, ear deformities, and mal-development of the jaw in the form of prognathism or a receding chin. Other lesions which result from failure of closure of congenital clefts or similar embryologic errors are seen occasionally but do not warrant discussion as individual problems. Burns are responsible for many of the most severe disfiguring and disabling scars and are unfortunately often not referred for definitive treatment until marked hypertrophied cicatrix formation has occurred with the development of contracture bands. Rarely do we see burns of the face without involvement of the trunk or extremities as well, and often patients are in such a poor state of nutrition and nitrogen balance that reconstructive procedures must be delayed until they can be put in optimum condition for surgery.

Acute lacerations and fractures of facial bones are usually treated at the time of accident by the general or oral surgeon. We feel that much secondary scarring can be avoided if the person who first sees

*Department of Surgery, University of Texas—Medical Branch.

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the patient uses careful technic with accurate approximation of tissues, delicate suture material, closure without tension, undermining the adjacent skin if necessary, attention to the proper direction

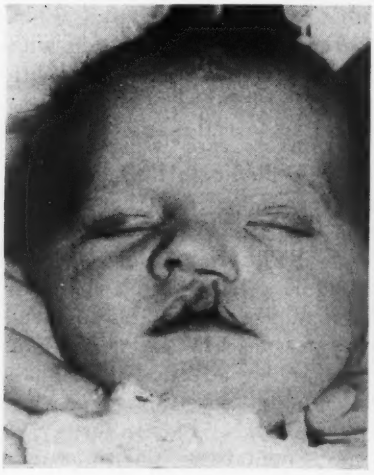

Fig. 1-A

Single, unilateral harelip.

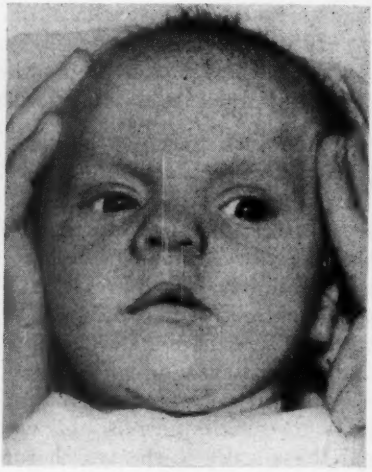

Fig. 1-B

Six days after surgery.

of incisions, and application of pressure dressings to prevent localized edema and hematoma formation. Avulsion wounds which were rather common in military surgery are encountered only rarely in civilian practice following gunshot wounds and traffic accidents.

Among the secondary traumatic lesions which require reconstructive surgery are wide, depressed, and adherent scars; asymmetry of the features; saddleback and hump deformities of the nose; and lesions which result from the removal of benign and malignant tumors.

Technics of plastic surgery include, in general, the rearrangement of tissues *insitu;* application of free skin grafts; and the use of flaps of tissue either directly or with the use of a pedicle to facilitate their transfer.

Many lesions can be removed by simple excision followed by undermining of adjacent skin and closure. When the line of a scar crosses normal skin creases or is situated in the malar region where there are no guiding wrinkles or shadow lines, the Z-plastic procedure affords a convenient method of achieving a relatively inconspicuous cicatrix. At times a scar may be pulled over gradually in multiple stages of excision until it is concealed by the hairline or in

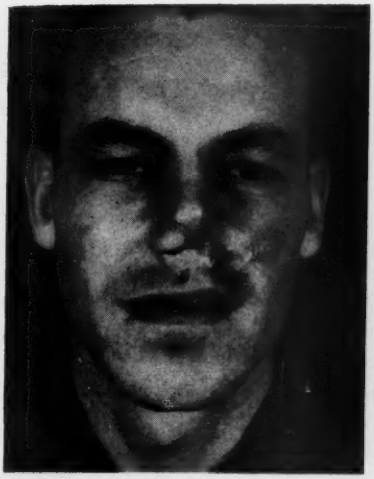

Fig. 2-A

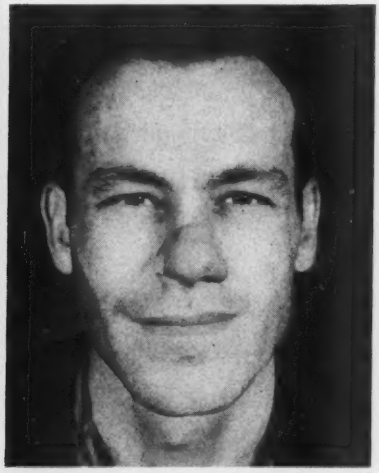

Fig. 2-B

Fig. 2-A. Deformity resulting from avulsion of nasal tip and obliteration of left nostril.
B. Repair with a pedicle flap from the neck.

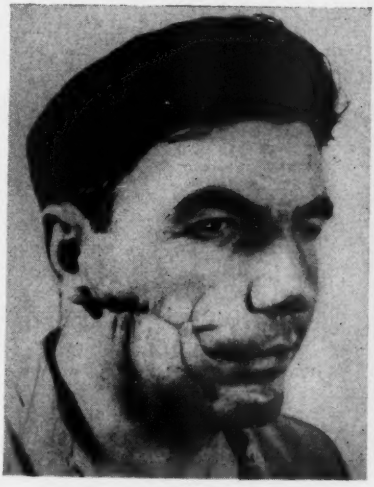

Fig. 3-A

Fig. 3-B

Fig. 3-A. Deformity from large avulsion wound, right cheek, with considerable loss of subcutaneous tissue.
B. Six months after repair by excision of the skin, extensive undermining and derma fat graft.

one of the normal folds of skin. Rearrangement of flaps of skin is the underlying principle of the operation for relief of harelip.

Free skin transplants are most commonly employed as thick split grafts for either temporary or permanent covering of raw areas. On the face they are employed chiefly as "dressing" of acute burns since they show considerable variation in pigment as compared with adjacent normal skin and have a tendency to contract and wrinkle. Full thickness grafts give a much better cosmetic appearance, especially when taken from the supraclavicular region, but are more difficult to apply and cannot be used in areas where infection is present.

Fig. 4-A

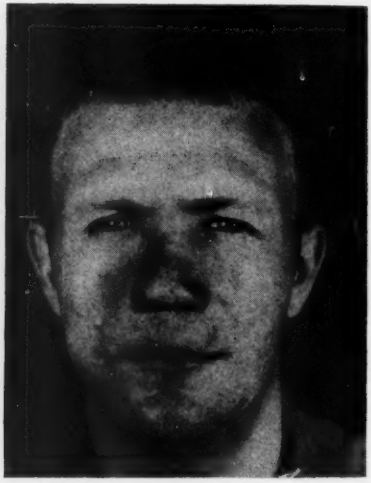

Fig. 4-B

Fig. 4-A. Severe avulsion of the face, loss of the upper lip, alveolar process, and loss of nasal support.

B. Reconstruction with pedicle flap and maintenance of contour with an upper denture prosthesis, and a bone graft in the dorsum of the nose.

When it is necessary to close a large defect and at the same time provide supple elastic covering, a flap must be employed. Neck flaps are very satisfactory for the relief of loss of the nasal tip and for certain cheek defects and we prefer them to forehead flaps. At times it is necessary to secure large amounts of tissue either from the chest or abdomen, perhaps with the use of the wrist as a carrier. These flaps may be lined with a thick split graft if mucosa as well as skin is to be replaced, and it is often possible later to remove by multiple excision the dead white skin which makes up the outer layer of the pedicle flap.

Preserved cartilage transplants are used to improve contour in certain types of rhinoplastic procedures and for the relief of de-

pression deformities of the forehead, face, and chin. Grafts of cancellous bone, taken from the ilium, produce good results in the repair of bony defects of the lower jaw and are employed at times in other parts of the face as well to relieve contour defects.

Conclusions

In conclusion it may be emphasized that congenital and traumatic deformities of the face should receive proper treatment at the hands of general and reconstructive surgeons as early as possible. Only an exceptionally well-adjusted individual can tolerate a significant amount of facial disfigurement without a great deal of psychic trauma. The surgical approach in every case presents its own problems, and good results are dependent upon patience, time, and adherence to sound plastic principles.

DIAGNOSIS AND TREATMENT OF INTRACRANIAL ANEURYSMS

DEAN H. ECHOLS, M.D.*
FREDERICK C. REHFELDT, M.D.**
New Orleans

MOST intracranial aneurysms do not exhibit any clinical manifestations until the time of rupture. When the leak or rupture occurs, the patient becomes suddenly ill and, in approximately 40 per cent of cases, dies within hours or days. There is little that the medical profession can hope to do to prevent such disasters. On the other hand, a small number of intracranial aneurysms produce signs and symptoms which should lead to diagnosis and treatment before they rupture. An example of these cases is spontaneous paralysis of the third cranial nerve, which is characterized by ptosis of the eyelid, an almost motionless eyeball and dilatation of the pupil, usually associated with pain in the forehead and orbital region. Aneurysm of the circle of Willis is the chief cause of this syndrome.

Fortunately, about 60 per cent of the patients who have a ruptured aneurysm do not die immediately and many apparently recover within a week or two. This group of patients is of great interest to neurosurgeons because about 28 per cent will die during subsequent rupture if surgical treatment is not instituted promptly. Although it is true that effective surgical treatment cannot be applied to all cases, many absolute cures and many probable cures are being obtained every year.

A clearer concept of the seriousness of the problem of intracranial aneurysms may be gained by a review of Hamby's[1] statistical study of the patients admitted to the Buffalo General Hospital during the fourteen year period preceding popularization of the surgical treatment of this disease. One hundred and thirty patients with bloody spinal fluid and other signs of ruptured intracranial aneurysm were studied. Demonstration of aneurysms in more than a third of the cases and critical clinical analysis of the others make it certain that more than 90 per cent of this group actually had aneurysms. Sixty seven of the 130 patients died in the hospital during an initial or subsequent attack; 14 of the survivors died elsewhere during subsequent rupture of an aneurysm; 24 have been severely or

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*From the Department of Surgery, Tulane University of Louisiana, School of Medicine and the Section on Neurosurgery, Ochsner Clinic, New Orleans.

**Fellow in Neurosurgery, Alton Ochsner Medical Foundation, New Orleans.

moderately crippled by such defects as hemiplegia and 21 are well and working. Only one patient was not traced in this remarkable follow-up study and only 3 died of unrelated causes.

Of 41 of our cases collected during a five year period (1944-1949) at the Ochsner Clinic, 35 (85.4 per cent) survived the first attack. This variance with Hamby's reported survival rate of only 60 per cent can be explained by the fact that we usually do not see patients during the initial attack; only 5 of our patients were seen on the day of the initial attack.

No age group is immune to attacks, since rupture has been observed in infancy and old age. It is more common, however, in the third, fourth, fifth and sixth decades.

Practically nothing can be done to prevent the development of intracranial aneurysms because more than 90 per cent are congenital in origin; the remainder are due to arteriosclerosis, endocarditis and syphilis.[2] Congenital aneurysms usually occur at the bifurcation of a vessel and are probably due to a congenital deficiency in the muscular coat.[3,4] They are occasionally associated with other congenital anomalies, such as coarctation of the aorta or polycystic kidneys.[5] Almost all intracranial aneurysms are on the basal surface of the brain on or close to the circle of Willis.[6,7] Fortunately, nearly 75 per cent of them are on or near the anterior half of the circle of Willis, where they can be exposed at operation.[6,8,9]

Aneurysms produce symptoms principally by leaking into the subarachnoid space, by directly compressing cranial nerves, or by rupturing into the brain to produce a hematoma. Free blood pouring into the subarachnoid space provokes a sudden, excruciating pain in the head and neck and at times vomiting. Immediate loss of consciousness and convulsive seizures are unusual. Stiffness of the neck, Kernig's sign, and low grade fever are evidences of meningeal irritation. The pupils may be unequal and react sluggishly. Choked disks, if they do occur, do not appear for several days. The spinal fluid is uniformly bloody and under increased pressure.

The presence of the aneurysm may be confirmed by its compression of certain cranial nerves, most commonly the third, fifth and sixth. Jefferson[10] found clinical evidence of compression of the third nerve in 55 of 158 cases. Frontal headache and ocular pain are probably signs of compression of the fifth nerve. If the eye cannot be moved in any direction, the sixth nerve is also compressed.

Mental disturbances and hemiplegia are indications of bleeding into the brain lateral to or above the internal capsule. Hematomas medial to the internal capsule compressing the hypothalamus are

usually terminal. Blood dissected into the brain to form a hematoma in 42 per cent of Hamby's cases.[1]

Although 90 per cent of cases of spontaneous subarachnoid hemorrhage of surgical interest are caused by congenital aneurysms, angiomatous anomalies and arteriosclerosis are other possibilities. Brain tumor is so rare a cause as to be inconsiderable.

Arteriography is indicated in cases of spontaneous intracranial hemorrhage without apparent cause.[12-14] The optimum time for performance of arteriography varies. The patient who has not become unconscious may have an arteriogram within twenty-four hours. Coma is an indication for delay. The theory that arteriography performed within a few days of the initial bleeding might incite further hemorrhage has not been proved.

Cerebral angiography, first introduced by Moniz[12] in 1934, became popular only after the development of suitable contrast media. Of the many different substances advocated thorotrast and diodrast seem preferable. Thorotrast is radioactive and not excreted. Diodrast, although rapidly excreted, lacks the brilliant radiopaque qualities of thorotrast. Moreover, untoward reactions may result from its use, although this has not been our experience.

The greatest problem which the technic of visualization of the blood vessels involves is mechanical.[13-15] Only by practice can the surgeon and the roentgen-ray technician time the roentgen exposure perfectly with the intra-arterial injection. The surgeon gains access to the carotid artery in the neck by entering it through the intact skin. This requires considerable practice. The carotid artery, so easily palpable in the neck, may prove to be elusive. The percutaneous puncture is made into the common carotid artery and the bevel of the needle turned laterally. With the needle in this position, according to Poppen,[15] the blood stream sweeps the flow of diodrast into the internal carotid, though at times some goes into the external carotid artery. This has been confirmed in our experience. The side chosen for the injection depends upon the lateralizing signs, such as pain or paralysis of the third nerve. However, subarachnoid hemorrhage commonly occurs without any hint as to the side of the aneurysm. Indeed, the aneurysm is often in the midline. Bilateral arteriograms may be necessary. If both sides are to be injected, however, we prefer to do the left side first, since aneurysms are slightly more common on that side. Should the angiogram of the left side show no abnormality the right side is injected twenty-four hours later. Bilateral filling of the anterior and middle cerebral arteries has been achieved on occasion by compressing the opposite carotid in the neck during injection of the diodrast.

The carotid, anterior and middle cerebral arteries and their branches are usually the only ones visible in the arteriograms. The vertebral, basilar, and posterior cerebral and posterior communicating arteries may be demonstrated by injection of the vertebral artery. This artery may be entered by percutaneous injection as it passes through its foramen in the sixth cervical transverse process. Aneurysms occur less frequently along the posterior system, which is fortunate, because most of them are surgically inaccessible.

In the arteriogram a congenital aneurysm appears as a dilatation of an artery or as an accumulation of the dye in the sac. The appearance is usually striking, and with anteroposterior and lateral views the artery involved usually can be determined. Unfortunately, the aneurysm sometimes fails to fill or it may be so situated that the contrast medium in the carotid artery does not reach it. If the aneurysm has produced a clot within the frontal or temporal lobe, the arteriogram will show displacement of the anterior and middle cerebral vessels.

A lesion which may simulate rupture of an aneurysm is the angiomatous malformation of the brain. It may not only cause recurrent subarachnoid hemorrhage but may also produce an intracranial clot. However, the characteristic appearance of angiomas in the angiogram establishes the diagnosis.

The use of air in the ventricular system as a contrast for examination of the cerebral contours, whether introduced directly into the ventricles through a trephine or by lumbar puncture, is a useful adjunctive procedure in certain cases of ruptured aneurysm, particularly those associated with intracerebral hematomas which have displaced the ventricles. We have had no experience which justifies the common belief that air introduced into the subarachnoid space would unfavorably affect an aneurysm.

Jefferson[10] of England and Dandy[16] of this country have been the real pioneers in the surgical treatment of aneurysms. Jefferson made the first attempt to ligate an intracranial aneurysm in 1927. Dandy's book on intracranial aneurysms, published in 1944, describing his "trapping" operation was a real stimulus to neurosurgeons.

Since Hamby[1] has shown that 40 per cent of patients die during the first attack and 28 per cent die during a subsequent attack, there is little justification for limiting treatment to bed rest and spinal drainages. Emphasis must be placed on early diagnosis by arteriography and some form of surgical treatment if the lesion is susceptible to such treatment.

Intracranial aneurysms may be rendered unlikely to rupture by

a variety of surgical procedures including (a) ligation of the carotid artery in the neck, (b) ligation in the neck plus intracranial ligation of the carotid distal to the aneurysm,[16] (c) ligation of the neck of the aneurysmal sac, (d) proximal and distal ligation of the vessel from which the aneurysm arises as in lesions of the anterior cerebral and anterior communicating arteries, (e) complete excision of the lesion, and (f) reinforcement of the wall of the aneurysm by the application of muscle.[17]

In considering the plan of placing the ligature or ligatures, one must avoid producing cerebral softening. For example, a clip cannot be placed on the middle cerebral artery at its point of origin without causing hemiplegia and death.

Ligation of the common carotid artery or the internal carotid artery in the neck does not as a rule produce hemiplegia. One may predict, to some extent, the likelihood of this complication by occluding the carotid artery in the neck for twenty minutes with digital pressure (Matas test). Should no evidence of weakness, aphasia, or "blacking out" occur, one may ligate the common carotid artery with reasonable safety. Ligation of the common carotid artery is believed to be safer than ligation of the internal carotid. In older people, the internal carotid can be ligated some weeks after ligation of the common carotid. Aneurysms of the intracranial portion of the internal carotid artery are rendered unlikely to rupture by carotid ligation in the neck because such a ligature eliminates the systolic thrust within the aneurysm. Some neurosurgeons prefer to ligate the common carotid in the neck for nearly all intracranial aneurysms of the anterior portion of the system, deferring intracranial ligation until there is evidence of further bleeding. Exactly what pressure changes, if any, occur within the intracranial arterial system after ligation of the common carotid artery is not known but Wechsler[18] says that the pressure within the aneurysm is reduced 50 per cent.

A more certain procedure for intracranial aneurysm of the carotid artery is Dandy's[16] trapping operation; that is, ligation of the internal carotid artery in the neck and ligation of the same artery within the skull at a point distal to the aneurysm. A lesion at the bifurcation of the carotid into the middle and anterior cerebral arteries might best be treated by ligation of the internal carotid in the neck or within the skull proximal to the posterior communicating artery. Aneurysms of the anterior and posterior communicating arteries should be trapped between two metal clips.

At operation one may find an aneurysm which, because of its size or location, cannot be trapped, ligated or removed. A piece of tem-

poral muscle packed around it may produce a fibrotic reaction which would strengthen its wall.[17] The treatment of hematomas within the brain consists in removal through a transcortical approach and obliteration or trapping of the aneurysm.[19]

Conclusions

1. Congenital aneurysms of the circle of Willis and its immediate branches are the source of 90 per cent of cases of spontaneous subarachnoid hemorrhage.

2. Bleeding from these aneurysms is fatal during the first attack in about 40 per cent of cases and during subsequent recurrence in approximately 28 per cent of cases.

3. A minority of aneurysms makes their presence known before rupture by localizing signs, as isolated third nerve palsy.

4. Arteriography is the only accurate means by which the diagnosis of an aneurysm can be established and its intracerebral location determined.

5. Prompt surgical treatment directed toward obliterating the aneurysm or reducing the systolic thrust within it is the only means of preventing recurrence among the 60 per cent of patients surviving the first attack.

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MANAGEMENT OF TRAUMATIC PERFORATION AND CONSTRICTIVE KINKING IN A POSTLITHOTOMY URETER

Presentation of a Case*

HARRISON C. HARLIN, M.D.
Chamblee, Ga.

PERFORATION of a ureter during instrumentation occasionally occurs, this perforation usually taking place at a point where the ureteral wall has previously been weakened by disease or trauma. The result may be any, all, or none of the following: urinary extravasation, infection, scarring, kinking of the ureter, formation of a fistulous tract, peri-ureteral cellulitis or abscess formation. The fate of the kidney above such a perforation depends on the type and severity of these processes and the ability of the surgeon to control infection and effect an adequate repair.

Intravenous urography is invaluable in demonstrating urinary extravasation where it exists. The insertion of a ureteral catheter in the presence of a known perforation enhances the chances for peri-ureteral infection as the catheter will often pass for a varying distance through the opening. If, however, the catheter can be introduced beyond the point of perforation and into the renal pelvis, it may be left in place to act as a splint and as a means of diverting a certain amount of urine from the area of pathology. Infection may be controlled by various appropriate therapeutic agents. Frank suppuration should be evacuated by the most efficacious means. Oftentimes no specific treatment is required—watchful waiting should be practiced.

There are some instances, however, where it is impossible to pass a ureteral catheter beyond the perforated area. When this happens and is accompanied by evidence of extravasation of urine or ectasia of the urinary tract above, one must resort to open operation. The ureter should be freed from any scar tissue bed if kinking has occurred. Then the most commonly used procedure is to introduce a ureteral catheter into the ureter and leave it in place to act as a splint and as a means of diverting a certain amount of the urine past the affected area, thereby protecting it from the irritating urinary products. At times a second ureteral catheter has been in-

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From the Department of Urology, Lawson V. A. Hospital, Chamblee, Georgia, and Emory University School of Medicine, Emory University, Georgia.

troduced through a small incision above the perforation—the distal end being exteriorized, this being another means of urinary diversion.

It is felt by this author that the use of a small rubber T tube (#10 French) instead of one or two ureteral catheters offers better diversion of the urine, as adequate a splint, more comfort and freedom of movement to the patient, and eliminates irritation to the bladder and urethra. In utilizing this method, the distal arm of the T is inserted into the ureter through a small incision above the point of perforation and passed down the ureter beyond it; the proximal arm is introduced through the same incision and passed up the ureter towards the kidney pelvis; the perpendicular portion of the tube is brought out the flank through a stab wound. This latter may be inserted at a future time into a receptacle attached at the patient's waist and allows the freedom of movement which an indwelling ureteral catheter taped to the penis often prohibits. The tube may be left in place for a period of up to three weeks. It is irrigated with an appropriate antiseptic solution plus solution "G."* An attempt is made to keep the urine acid and so diminish the chances of deposition of calcareous materials in the tube. The T tube is removed by exerting gentle traction and the resultant sinus, as a rule, will close within a day or two. Following this, ureteral dilatation should be carried out at varying intervals depending on the condition of the ureter and the kidney.

Case Report

History: R. M. H., a 54 year old white male, was admitted to Lawson Hospital on 26 July 1948 complaining of severe right flank pain radiating to the right groin and to the right testicle. Approximately 3 weeks prior to admission, the patient had experienced a sudden onset of right costovertebral angle pain which had radiated into the right testicle and had lasted approximately two and a half hours. This was followed within 12 hours by gross hematuria. A similar episode had occurred approximately one week later. The last attack, his third, had its beginning 24 hours before his admission to the hospital. The symptoms were typical of right renal colic. There was no hematuria at the time of admission. The past history was entirely non-contributory. There was no history of hematuria, dysuria, renal or ureteral colic or any of the symptoms referable to genito-urinary pathology prior to the first attack. His system review was entirely normal. The family history was not remarkable.

Physical Examination: Physical examination revealed a 54 year old white

*Solution G:

Citric acid monohydrate	32.875 Gm.
Magnesium oxide anhydrous	3.840 Gm.
Sodium carbonate anhydrous	4.370 Gm.
Distilled water q.s. ad.	1,000 c.c.

pH should be 4.0 when ready for use.

male, moderately obese, and in moderate distress. Temperature was 98.6, pulse rate was 100 per minute, respirations 20 per minute, systolic blood pressure was 135 mm. of mercury, diastolic 95 mm. of mercury. There was some spasm in the right upper quadrant of the abdomen, associated with right costovertebral angle and right upper quadrant tenderness. Tenderness was also present in the right suprapubic area. Rectal examination revealed a one to two plus enlargement of the prostate, the gland itself being somewhat tender. The seminal vesicles were not palpable and there was no induration in the vesicular areas. The remainder of the examination revealed no abnormalities.

Laboratory Data: The white blood count was 14,000 with 81 per cent polymorphonuclear leukocytes; 14 Gm. of hemoglobin were present. Initial urinalysis was as follows: Amber and slightly cloudy in appearance, acid reaction, 1.018 specific gravity, a very slight trace of albumin; microscopic examination revealed rare red blood cells and white cells and a few epithelial cells. Repeat urinalyses were essentially the same. Urine cultures revealed a heavy growth of proteus vulgaris and beta hemolytic streptococcus.

X-Ray: Retrograde urograms done on 28 July revealed a normal left kidney and ureter. The right kidney shadow was normal. At the level of the inferior margin of the fourth lumbar vertebra was a sharply delineated calcific density, measuring approximately 2 mm. in diameter. A radiopaque catheter extended up to this point. No dye could be injected beyond this point into the ureter and pelvis of the kidney. Intravenous urograms revealed a non-functioning right kidney and the previously noticed opacity at the level of the inferior border of the fourth vertebra on the right.

Hospital Course and Treatment: On 28 July 1948, cystoscopy and retrograde urography were performed under local anesthesia. The bladder was essentially normal. A #6 French radiopaque catheter was passed to 27 cm. on the left with obstruction, and the urine obtained was normal. On the right no type of catheter could be passed beyond 20 cm., where a definite obstruction was met, and no urine could be obtained. On the 29th a catheter was passed up the right ureter until it met obstruction at 21 cm. The catheter was left in and strapped to the penis. On the following day, July 30, a right ureterolithotomy was done. No suture was placed in the incision in the ureter. The patient withstood the procedure well and was returned to the ward in good condition. Chemical analysis of the removed calculus was positive for oxalates, calcium and phosphates. It was negative for carbonates, magnesium, ammonium, uric acid, urates, cystines and sulfonamides. His postoperative condition was entirely satisfactory although for a time an increasing amount of urine started to pass through the incision. The urinary fistula gradually became smaller and the drainage subsided by August 18, at which time the wound was completely healed. The drain was removed on the fifth postoperative day and the sutures removed on the seventh postoperative day.

Cystoscopy was performed on August 13. A mild generalized cystitis with associated pouting and reddening around the right ureteral orifice was noted at this time. A ureteral catheter was passed up the right side for a distance of 20 cm. where an obstruction which could not be passed was met. Seven and a half c.c. of contrast medium were injected into the right catheter and a film was made. The preliminary film on the right showed that the tip of the catheter extended up to the level of the fourth lumbar vertebra on the right overlying the middle of the wing of the ilium. Following the injection of opaque solution, there was visualized a lateral displacement of the ureter and angula-

tion at this point. A small amount of dye extended into the upper portion of the ureter and into the calyces, both of which revealed minimal dilatation. A considerable amount of dye was extravasated through a sinus extending out to the skin of the flank (fig. 1). Intravenous urograms done on 23 August revealed a moderate dilatation of the ureter, pelvis, and calyces on the right side (fig. 2).

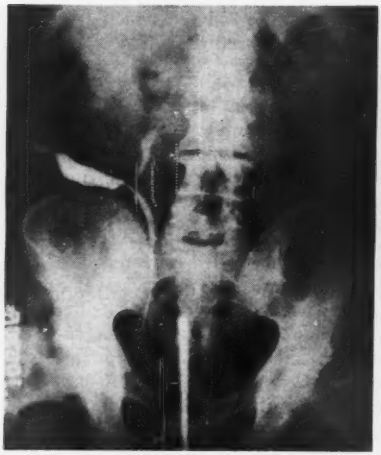

Fig. 1. Injection film showing the passage of a catheter from the ureter into the retroperitoneal space at the point of a previous lithotomy incision.

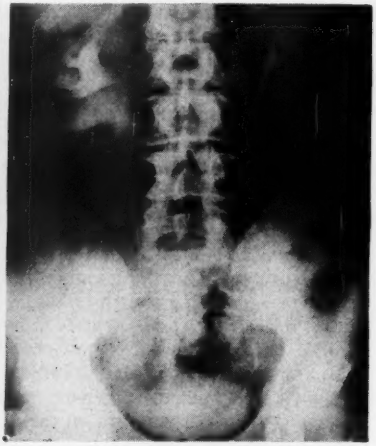

Fig. 2. Intravenous urogram showing hydronephrosis on the affected side. The ureter is not identified.

On the 24th cystoscopy and catheterization of the right ureter were again performed. The catheter was passed up the right ureter for a distance of 25 cm. without meeting any definite obstruction. No urine returned from this catheter. A flat plate was taken and a study of the film showed that the catheter had exited from the ureter at the point of the lithotomy incision and the tip of it lay just beneath the skin at the level of the incision. The incisional wound was opened and drained, the drainage being uriniferous. Cultures of this drainage revealed a heavy growth of Aerobacter aerogenes and Proteus vulgaris. Following the ureteral lithotomy, repeat urines had remained persistently acid and microscopic examination revealed a moderate number of red blood cells and innumerable white cells with much bacteria present. His nonprotein nitrogen at all times remained within normal limits.

On 27 August the patient was brought to the operating room with a preoperative diagnosis of perforation of the right ureter, traumatic, at the site of previous lithotomy; urinary fistula formation; kinking of the ureter due to periureteritis and scar formation; hydroureter and hydronephrosis above the point of kinking. With the patient in the usual kidney position and under general anesthesia, sterile preparation and drape were performed. The old wound was reopened and the peritoneum pushed medially. The ureter was identified at the region where it crossed the iliac vessels and was traced proximally. At the site of the previous lithotomy, it was found to be incorporated in a mass of "cartilagenous" scar tissue. There was kinking at this point, as

well as an opening in the ureter distal to it. This, of course, represented the point of perforation due to passage of the ureteral catheter. The ureter was then freed from its adhesive bed and the angulation straightened. A small incision was made in the ureter proximal to the site of perforation and a rubber T tube (#10 French) was inserted so that the distal arm of the T splinted the ureter past the site of the original perforation, while the proximal arm was

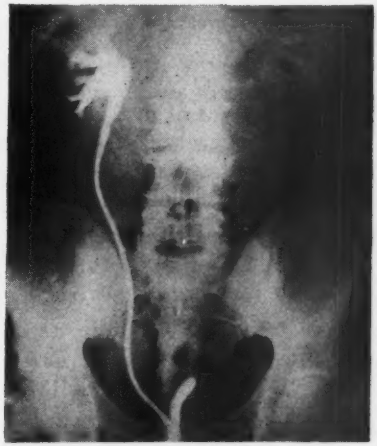

Fig. 3. Retrograde urogram done on 2 Feb. 1949, revealing a normal right kidney and ureter. The urine from this side was clear and sterile.

passed up the ureter towards the kidney pelvis. The perpendicular portion of this tube was then brought out the side through a stab wound. A penrose drain was left in place down to, but not touching, the ureter. The operative site was closed in layers by means of interrupted #32 steel wire sutures. The skin was approximated by means of black silk sutures. The patient withstood the procedure well and was returned to the ward in good condition. He was given 500 c.c. of whole blood and intravenous fluids that evening.

His temperature remained essentially normal after the third postoperative day. The T tube was irrigated alternately with zephiran chloride solution, 1:40,000 and G solution, the latter being used in an attempt to avoid any formation of calcareous material in or around the tube. The penrose drain was removed on the sixth postoperative day and there was only mild to moderate drainage following this. The T tube was removed on the 18 September, 22 days following the operation. After removal of this tube, there was practically no drainage from the incisional area. Intravenous urograms done on the 20th revealed adequate clearance of the dye bilaterally at five minutes. On the right side there was moderate caliectasis and pyelectasis and ureterectasis involving the upper portion of the ureter. The remainder of the right ureter was not visualized. On the 23rd retrograde urograms were done. A #10 French ureteral catheter was passed easily, to 27 cm. on the right, there being no obstruction. A hydronephrotic drip was obtained from this side. Urine examination revealed 2 to 4 pus cells per high power field. Pyelograms showed the previously noted hydroureter and pyelectasis. The calyces presented good

"cupping." Two days following this retrograde urogram the patient was dismissed from the hospital. Penicillin, streptomycin and sulfadiazine had been employed singly and in combination during various stages of his hospital stay. He returned at bi-weekly intervals on three occasions for dilatation of the right ureter. Thereafter the interval between dilatations was lengthened and pyelograms and ureterograms taken at these times revealed a diminishing ectasia. The urine from the right kidney has been cleared of infection and his latest films taken on Feb. 2, 1949, revealed a normal kidney and ureter (fig. 3).

Summary

1. It is suggested that in cases of instrumental perforation of the ureter which requires open operation, a small rubber T tube (#10 French) instead of an indwelling ureteral catheter be employed as a splint and means of urinary stream diversion.

2. Vesical and urethral irritation so frequently seen accompanying the use of an indwelling ureteral catheter is eliminated and more comfort and greater freedom of movement is thereby afforded the patient.

3. A case in point is presented.

Lawson V. A. Hospital,
Chamblee, Georgia.

CONGENITAL ARTERIOVENOUS FISTULA OF LOWER EXTREMITIES WITH PELVIC COMPLICATION

W. O. JOHNSON, M.D.
Louisville, Ky.

CONGENITAL arteriovenous fistula results from failure of differentiation of the common embryologic anlage into artery and vein. Multitudinous communications are present between arteries and veins at the beginning of the process of differentiation, and the congenital type of abnormal communication between arteries and veins appears to be the result of presistance of vessels or communications of the primary anlage which fail to differentiate and form anastamosing channels either directly or indirectly between other normally developed arterial and venous trunks.

These anomalies have been reported in many localities in the body, but are most often demonstrable in the lower extremities. They may be extensive or involve as little of the extremity as a single digit.

The presence of varicose veins that occur early in life without any obvious cause, and associated with enlargement of, together with elongation of, the extremity, with or without venous pulsations, or bruits, and associated with cavernous hemangiomas or diffuse hemangiomas without dependent edema, and with excessive hair, sweating and increased warmth of the extremity and the finding of increased oxygen content of the venous blood, are some of the characteristics of the anomaly; but the finding of vaginal protrusions associated with such anomalies is very infrequent. The following case, we believe, is such an example:

CASE REPORT

Mrs. J. W., 35 year old white female, Para I, Gravida III, was admitted to Louisville General Hospital on Oct. 17, 1948, and discharged on Nov. 15, 1948.

Chief Complaint: "Something hanging out of vagina"; varicose veins of both legs.

Past History: Last pregnancy 11 years ago, resulting in a normal, living child. *Menses:* Regular, 4 days, normal flow. No subjective symptoms.

Family History: Negative. No similar vascular anomalies in family.

Present Illness: Since the age of 6 years, the patient has had varicose veins of both lower extremities which have gradually become worse with age. The veins swell and ache when she is tired, but the condition was not appreciably changed by the spontaneous delivery 11 years ago. She has never had localized

From the Department of Gynecology, University of Louisville Medical School, Louisville, Ky.

areas of redness or swelling. About one and a half years ago, the patient noticed a mass gradually protruding from her vagina; this was not tender. The mass has gradually increased in size, and is associated with heavy feeling in the pelvis after being on feet, and an increased vaginal discharge. No urinary or bowel disturbances associated with the mass. The mass can easily be replaced into the vagina, but readily returns when she is on her feet. Last menstrual period was October 10, lasting 4 days. The mass is not changed by the menstrual period. There is low postural backache at times. Otherwise the patient is a normal, healthy woman.

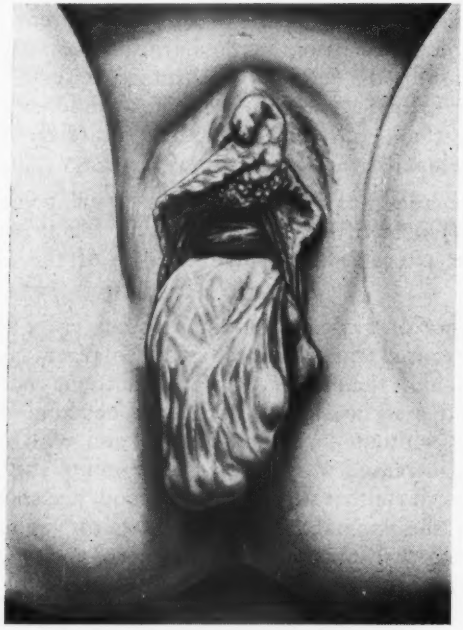

Fig. 1

Physical Examination: Obese woman of 35 years. Blood Pressure: 120/70. Pulse: 80. Respirations: 22. General physical examination is essentially negative above the umbilicus.

Abdomen: Large, thick-walled and pendulous. Some dilated veins in the inguinal region, otherwise negative.

Vaginal: Numerous condylomatous lesions surrounding the clitoris and upper part of the labium minus. Moderate grade relaxation of vaginal outlet with varicosities of the wall of the vagina and vulva. Some excessive mucoid vaginal discharge. There is a sac-like structure 4 inches long extending from the vagina posteriorly and laterally, to the left of the cervix (fig. 1). The sac is freely movable, not indurated, soft and vascular, and cords of vessels can be felt. Contents cannot be made out in detail, but in addition to numerous vessels there are rounded, firm masses that are adherent to the stem-like process that extends up to and to the left of the cervix. The masses in the sac are

translucent (fig. 2). The cervix is soft, congested and dilated, and admits two fingers. There is some irritation of the endocervix. The uterus is enlarged to about twice normal size and is congested, in first degree retroversion, partially fixed on the left with thickening in the left adnexa. The right side is freely movable and not adherent. The ovaries are not enlarged, movable, and not tender. Varicosities are felt in the right adnexal region and are numerous about the bladder and vagina.

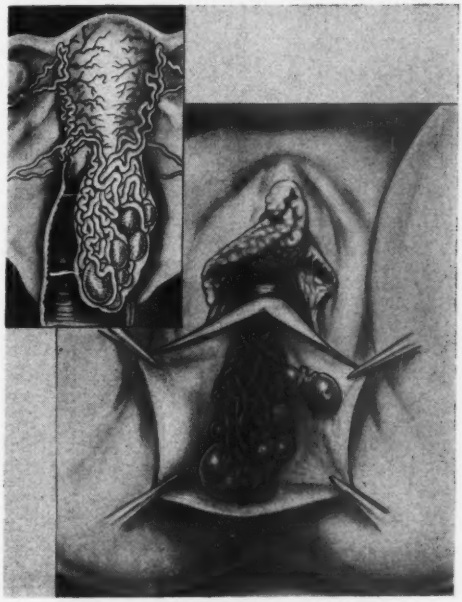

Fig. 2

Lower Extremities: There are innumerable varicosities of both lower extremities from the vulva down and on both sides of the legs, with large venous sinuses (arteriovenous fistula) that have no characteristic pattern in both legs, more marked on the right than the left (fig. 3). The right leg is 1½ inches longer than the left, and the right leg is the larger in circumference by one inch and more congested throughout than the left leg. No bruits or thrills are heard over these venous sinuses which are soft and easily compressed and are not tender. They are quickly influenced by posture. Both extremities have excess of large, coarse hair, and are warmer than other parts of the body. No pitting edema.

Impression:

1. Congenital, multiple varicosities of pelvic structures and of both lower extremities with arteriovenous fistulas.
2. Varicosities of vaginal walls with Gartner's duct cyst, left.
3. Relaxed vaginal outlet with cystocele and rectocele, with stress incontinence; descensus of uterus, slight.
4. Condylomata acuminata of clitoris and vulva.

5. Deformity of osseous structures.
6. Fibroma of toes.

X-rays of both feet show numerous exostoses characteristic of osteomata of feet, particularly the metatarsal bones. There is a large, bony mass posterior and superior to each os calcis which may be a congenital accessory os calcis. Pelvic tilt to left with valgus deformity of left hip.

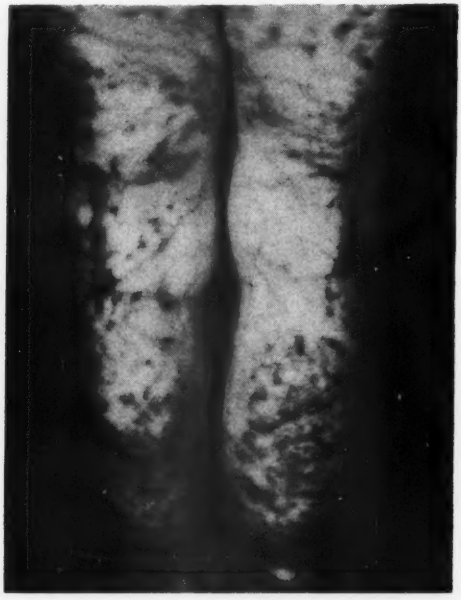

Fig. 3

Cystoscopy: Essentially a normal bladder with moderate cystocele. Pyelogram: Normal kidneys with ureters slightly more lateral in bony pelvis than usual, otherwise normal. Multiple phleboliths in pelves, otherwise normal. No urinary disease.

Six foot plate of chest shows heart and great vessels within normal limits.
Pregnandiol level in urine: 10.4 mg. per 24 hours.
Skull is negative to x-ray. Sella negative.
Upper gastrointestinal tract normal to x-ray examination.

Laboratory Work: Red blood count 4,920,000. White blood count 7,250. Hemoglobin 13.5 Gm. Differential: Polys. 74 per cent. Lymphs. 22 per cent. Urine: Amber, specific gravity 1.026, acid, negative for albumin and sugar. Microscopic negative except for epithelial cells.

October 26: (1) Exploratory laparotomy; excision of fetal rest from region of right ovary. (2) Excision of cervical retention cysts and varicosities from left vagina and cervix, under spinal and pentothal anesthesia. Exploration of the pelvis revealed normal uterus which was deviated to the right, enlarged but fibrotic ovaries, and normal tubes; congenital cyst on right infun-

dibulopelvic ligament as described in the pathologic report. There were numerous dilated veins in the broad ligament and bladder and the true pelvis, but no definite pathology made out in the arteries (figs. 3 and 4). No other congenital anomalies noted.

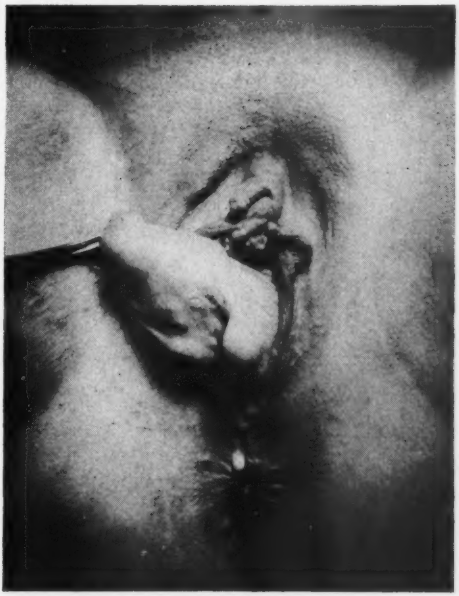

Fig. 4

Pathologic Report: (1) Cystic mass 22 by 20 by 20 mm. arising from right infundibulopelvic ligament beyond the end of the right tube. The cyst is lined with pseudostratified columnar epithelium surrounded by dense fibrosis and connective tissue.

Impression:

1. A wolffian body rest or fetal rest cyst.
2. Large flat piece of tissue, 15 mm. by 3 by 5 cm., contains cysts. (These cysts are lined with flattened stratified epithelium. The surface is covered with stratified squamous epithelium; in a few of these cystic masses are purulent exudate.)
3. Retention cysts of the cervix with dilated veins.
4. Typical papillomas of clitoris and labia, of fibrous connective tissue base, with no evidence of malignancy.

The patient had an essentially normal postoperative course and convalescence with only slight tenderness over the veins of the lower extremities which was relieved by binding and ambulation. She was discharged on November 15. Wound healed, condition satisfactory. No complaints.

Follow-up shows the patient to be in good condition, 5 months postoperatively.

In retrospect, the protruding mass from the vagina was taken to be Gartner's duct cysts, but were retention cysts of the cervix that were increased in size and weight by the venous congestion around them and resulting in a protrusion of mucous membrane of the cervix and vagina from the vascular weight. The congenital anomaly of the vascular system in the pelvis and vagina was so great that further vaginal repair work was not done.

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WHAT SHOULD THE GENERAL SURGEON DO WITH HIS PROSTATIC PATIENT?

I have selected this subject in support of the general surgeon. These days of super specialization bring up this question for critical review. I have found that the two most useful types of doctors to the people are: The general practitioner (family doctor), and the general surgeon. A good doctor of either type can examine the man and decide if his prostrate should be removed. The one decision to make is: Can this man adequately empty his bladder? This decision hinges on how much residual urine the patient has. The doctor should catheterize and measure the residual urine, and then repeat if necessary. Unless there is over three or four ounces of residual urine, one cannot expect any brilliant results from prostectomy. After a general examination, with the emphasis on rectal examination of the prostate, one should note if there is any hardness of the gland; also check to see if the patient appears fairly normal,

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Read before the seventeenth annual Postgraduate Surgical Assembly of The Southeastern Surgical Congress, Biloxi, Mississippi, May 23-26, 1949.

if his tongue is moist, and whether or not he eats and smokes normally. Routine laboratory work should also be done. This includes complete blood count, urinalysis, N.P.N., x-ray of chest, and flat plate of genito-urinary tract. We do not cystoscope them as it is too painful and often gives reaction. If you decide that the patient has an obstructing prostate that should be removed, then it is your duty to talk it over with him. He may say, "Wait," but if he agrees to surgery, you must decide who should operate. If there is a doctor associated with you or nearby who can carry out a better operative procedure than you can, there is only one course to follow—refer the patient to this doctor.

For many years I have done practically all the prostatic surgery for our group. I have tried almost all methods but for the last few years have done nothing but the suprapubic approach as I find this the most successful for me.

I am reporting the last one hundred cases of prostatism that we hospitalized. In 76 cases we removed the prostate. The other 24 cases were not operated either because of serious cardio-renal disease, or because the patient did not choose to be operated at that time. Their ages were as follows: Three were in their fifties, 23 in their sixties, 44 in their seventies, and 6 in their eighties. Four had previously had transurethral resections by capable men. Twelve cases proved to be malignant. However, all but two of the twelve were diagnosed by rectal examination previous to the operation. The majority of these cancer patients, however, are still living and fairly comfortable, taking a moderate dose of stilbestrol twice daily, supplemented often with x-ray therapy.

Preparation for Surgery

We insist upon a retention catheter for a few days before operating. We give penicillin 100,000 units every 4 hours with one-half gram of streptomycin daily. The patient should have a moist tongue, an N.P.N. under 60, and he should eat, and smoke (if a smoker) normally in order to be rated a good risk for surgery.

Surgery

We rarely do the preliminary cystotomy. We use a low spinal, 60 mg. metycaine. Always insist upon good exposure with good light. First, coagulate the vessels standing out on the prostate. Then with the gloved left hand, and extra long glove, in the rectum, lifting up the prostate, proceed with the index finger of the right hand to break through the capsule in the urethra and peel out the gland. Inspect the prostatic bed and remove all lobes leaving the

floor near level with the base of the bladder. If only fibrosis is present, bite out a good channel, then clean out clots, and coagulate all bleeders that you can locate. Now inflate the Foley bag with 20 or 30 c.c. of water, pack the prostatic cavity with oxidized gauze, letting it come out around the rim, then pull the bag into place and hold. Wait a few minutes and observe for bleeding. *This is a vital stage. One must be sure to control serious hemorrhage.* Then close the bladder from below with one row of catgut, inserting #32 catheter into the bladder, coming out at the upper angle. Close around catheter snugly, and sprinkle sulfathiazole into suprapubic space and wound, then close muscle fascia and fat with catgut. Now close the skin with silk, and anchor the suprapubic catheter with silk.

Postoperative Procedure

Start immediately keeping the catheters open by injecting air through urethral catheter which should escape through suprapubic catheter. The nurse should do this every 10 to 15 minutes for the first 2 hours. The pull on the urethral catheter is released after 4 hours, if no symptoms of active bleeding. All patients are given blood and glucose (10 per cent) plain with Solu. B while on the operating table, the blood being repeated if necessary. One thousand c.c. of 10 per cent glucose with Solu. B is given every day for 4 or 5 days, and a soft diet is served as soon as desired. Penicillin 100,000 units every 4 hours, with one-half gram streptomycin daily, should be continued for 6 days. In normal cases the patient is up in a chair by the second day, but should have special nursing day and night.

After the third day if the urethral catheter is draining well, remove the suprapubic catheter, but leave the urethral catheter 8 to 10 days. A few cases will leak above for some time. This is not serious. Reinsert the urethral catheter or wait. It will close. If the urethral catheter does not drain and gives pain, remove it after 3 to 5 days, clamping the other catheter off at intervals to assist in voiding.

Complications

Two of these 76 patients died, both after leaving the hospital, most likely of pulmonary embolism or coronary; we were unable to obtain autopsies on these two. The other 74 were relieved. We occasionally have thrombi and emboli. Some we treat with heparin and dicumarol, some without. I am not deeply impressed with the great value of these drugs. I believe primarily in penicillin, streptomycin, and activity.

Conclusions

These are grateful patients. Don't fail to put forth every effort to relieve them. The general surgeon can operate these cases successfully if he will adhere to basic principles of surgery.

C. C. Howard, M.D.

BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.*

PRACTICAL ASPECTS OF THYROID DISEASES. By GEORGE CRILE, JR., Philadelphia. W. B. Saunders Co., 1949. 355 pages.

The author has presented an admirable small volume of pertinent material on thyroid disease. This work has, I believe, attained the aim of the author to present the picture of thyroid diseases so that treatment by internists, surgeons and radiologists may be easier.

The author speaks from his own experience with his own patients and not with as impressive figures as could be accumulated from the patients of the Cleveland Clinic, although one knows that behind the words and between the lines lies the influence of the author's illustrious father.

The only criticism of the volume is one of omission and not of commission—the failure to discuss fully the chronically toxic goiter. The chapter on malignancy of the thyroid is very worth while, as is the chapter on surgical technic.

This volume should be found in the library of every surgeon and internist as well as of every radiologist, for it is well written and full of valuable information. Only a minimum of theoretic material which cannot be proved is included, and it is probably not as complete as the thyroid specialist would desire.

A. H. L.

CLINICAL ASPECTS AND TREATMENT OF SURGICAL INFECTIONS. By FRANK LAMONT MELENEY, M.D. Philadelphia, W. B. Saunders Co., 1949. 840 pages.

The author has masterfully compiled in this volume from his personal experience, as well as the experience of others, a mine of information. The volume is well written in an easy to read style and is arranged systematically.

In general, each topic is first briefly defined, then the etiology, bacteriology, symptomatology, physical findings and treatment are described in considerable detail. Usually a few illustrative case reports are included to bring out important details.

This book is modern in all detail describing the use and misuse of all of the sulfa drugs as well as penicillin, streptomycin and bacitracin. The index makes instant reference possible.

Here is a volume which fills a gaping hole in medical literature and which should be of use to the occasional surgeon as well as to the surgical specialist.

A. H. L.

CARE OF THE SURGICAL PATIENT. By JACOB FINE. Philadelphia, W. B. Saunders Co., 1949. 540 pages.

The author has compiled, with the help of many colleagues, a multitude of general information. There are many useful ideas expressed, but in such a

manner as not always to be easily found. The information presented is far from complete and needs much detail to be adequate, while there is much repetition of simple facts known by any well versed medical student.

The chapter on anesthesia, like many others, lacks much detail and the views expressed are very biased. In a volume which bears the title, "Care of the Surgical Patient," the emphasis should be on the details of the treatment during the pre- and postoperative periods and less time spent in rambling on about clinical laboratory procedures and diagnosis.

The chapter on fluid balance is quite inadequate in view of the vast amount of research work done recently. The lower nephron syndrome is not mentioned, nor is the treatment of postoperative oliguria outlined.

A. H. L.

SOUTHWESTERN SURGICAL CONGRESS*

More than 600 surgeons from Arizona, Arkansas, Colorado, Kansas, Missouri, New Mexico, Oklahoma, Texas, Utah, and Wyoming met in Houston, Texas, on September 26 through 28 for the first annual conference of the year-old Southwestern Surgical Congress.

New ideas and contributions toward the scientific advancement of surgery and surgical diagnosis were discussed and demonstrated. The three day meeting had as its speakers some of the nation's most outstanding surgeons who covered the newest technics and methods of modern medicine.

The authorities included Dr. B. T. Beasley of Atlanta, Georgia, Secretary of The Southeastern Surgical Congress; Dr. Francis C. Grant of Philadelphia, Professor of Neurosurgery at the University of Pennsylvania School of Medicine; Dr. R. L. Sanders, Professor of Surgery, University of Tennessee College of Medicine, Chief, Surgical Division, Sanders Clinic, Memphis, Tennessee; Dr. Karl A. Meyer of Chicago, Professor of Surgery at Northwestern University Medical School; Dr. Arthur H. Blakemore of New York City, associate attending surgeon at the city's Presbyterian Hospital; Dr. Alton Ochsner of New Orleans, Professor of Surgery at Tulane University Medical School; Dr. Brian T. King, well known Seattle, Washington, surgeon; Dr. J. Dewey Bisgard, University of Nebraska Professor of Surgery; Dr. J. Duffy Hancock, University of Louisville; Dr. Earle Conwell, University of Alabama Medical School; Dr. Barrett Brown, Professor of Plastic Surgery at Washington University Medical School; and Dr. Murray Copeland, special consultant to the Cancer Control Bureau in Washington.

Other technical papers were read and discussed by members of the congress. Question and answer sessions were conducted during luncheons to enable members to get information not included in the program.

New officers of the Southwestern Surgical Congress are Dr. Thomas G. Orr, Kansas City, President; Dr. Leo J. Starry, Oklahoma City, President-Elect; Dr. Herman Dustin, Houston, Texas, Vice-President; Dr. Charles R. Rountree, Oklahoma City, Secretary-Treasurer; and Dr. Louis P. Good, Texarkana, Arkansas, Historian. Dr. Walter Stuck of San Antonio, Texas, is the retiring President.

The Southwestern Surgical Congress will meet again in September, 1950, in Kansas City, Missouri.

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*Prepared and submitted for publication by Mr. D. H. Plackard, Executive Assistant, State Medical Association of Texas, Austin, Texas.

ANNOUNCEMENT OF VAN METER PRIZE AWARD

The American Goiter Association again offers the Van Meter Prize Award of Three Hundred Dollars and two honorable mentions for the best essays submitted concerning original work on problems related to the thyroid gland. The award will be made at the annual meeting of the Association which will be held in Houston, Texas, March 9, 10 and 11, 1950, providing essays of sufficient merit are presented in competition.

The competing essays may cover either clinical or research investigations; should not exceed three thousand words in length; must be presented in English; and a typewritten double spaced copy in duplicate sent to the Corresponding Secretary, Dr. George C. Shivers, 100 East St. Vrain Street, Colorado Springs, Colorado, not later than January 15, 1950. The committee, who will review the manuscripts, is composed of men well qualified to judge the merits of the competing essays.

A place will be reserved on the program of the annual meeting for presentation of the Prize Award by the author, if it is possible for him to attend. The essay will be published in the annual proceedings of the Association.

PLASTIC SURGERY AWARD

The Foundation of the American Society of Plastic and Reconstructive Surgery, Inc., offers an annual award of $250.00 to a young surgeon who is a citizen of the United States, and who shall give promise of distinguished research work in the field of plastic and reconstructive surgery. The award will be made on the basis of a written outline of the research project to be undertaken, and a report upon completion of the project will be presented to the Society by the author at a subsequent annual meeting of the Society.

For full particulars write to the Secretary, Dr. Clarence R. Straatsma, 66 East 79th Street, New York, N. Y. The outline of research to be undertaken must be in his hands by November 1, 1949.